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THE EFFECT OF MAJORITY OPINION ON THE CREATIVE SCHOOL CHILD

by

Reta L. Stone
B.A. University of British Columbia, 1949

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A B S T R A C T

This study was an attempt to explore the relationship between creativity and intelligence and children's behaviour in a situation where they are confronted by a group of their peers giving unanimous incorrect answers on a simple perceptual test.

The experimental subjects were divided into four groups on the basis of I.Q. scores and scores on a test of creative thinking. The four groups were: A. high on both tests, B. high on creative thinking, average on I.Q., C. high on I.Q. and average or lower on creative thinking, D. average on I.Q. and average or lower on creative thinking.

The perceptual test consisted of twelve pairs of white cards. Each pair consisted of one card with a single black line and the other with three black lines. The task was to judge which of the three lines on the one card was equal in length to the single line on the other card of the pair.

Each of the experimental subjects took the perceptual test in company with a group of six peers who had been instructed to give incorrect answers to eight of the twelve judgments. Each experimental subject's answers were recorded to determine how many times he "followed" the group.

A B S T R A C T
(cont'd.)

An analysis of variance, with a co-variance adjustment for the sex factor, did not yield statistically significant differences between the total number of times subjects in each of the four groups "followed" the "majority" group's answers. When two groups were distinquished on the basis of sex it was found that although the groups were virtually the same on creativity and intelligence scores, the differences on the "following" scores was significant at the .01 level, with boys "following" less than girls.

P R E F A C E

The author wishes to express appreciation to Rev. M. A. Record, C.S.B. under whose direction this study was undertaken and also Dr. J. Callagan and Dr. A. A. Smith for advice and guidance. Thanks are also due to the officials of the Windsor Public School system and especially to the principal, teachers and pupils of Ada. C. Richards school.

Appreciation is also expressed to Dr. E. P. Torrance for his kind permission to use the Minnesota Tests of Creative Thinking.

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CHAPTER 1

INTRODUCTION

Creativity has interested mankind through all of history, but no systematic study has been attempted until recent years.

The concept of intelligence has engaged the interest and attention of philosophers, psychologists and others down through the ages. The work of Simon, Binet and Wechsler at the end of the 19th and early in the 20th century focused attention on the measurement of intelligence. This area of research and study has been dominant until recently. Since 1950, however, attention has begun to turn more to other factors involved in learning. The concept of creativity is receiving increasing attention.

As early as 1898, G. V. Dearborn (1898, p. 183-190) had observed, though rather casually, that giftedness in intelligence and creativity were by no means synonomous. By 1946 this observation had become a common-place finding but even today intelligence tests are essentially the same and for most purposes, certainly in the school situation,

the intelligence test score has been taken to be a comprehensive representation of a child's intellectual capacity.

In 1950, J. P. Guilford (1950, p. 444-454), speaking before the American Psychological Association, described research which he had recently begun, stated hypotheses he had developed and outlined plans for the study of the subject of creativity. His talk heralded a widespread interest in scientific research into the whole study of creativity - its definition, identification and development. This interest is reflected in the increasing number of conferences being held on the subject and the growing literature in psychology and education on this topic.

The recent, growing, world-wide concern about maximum use of human potential has also been influential in the development of this interest. As C. W. Taylor (1964, p. 3) stated: "If we are to survive in international competition, our most promising solution to this manpower problem is for this nation to encourage and support the identification and development of various types of important personnel. One such type is the highly creative person, for even a few such persons in science can keep our scientific movement vigorously in front." The interest of the general public also can be seen in magazine articles which have appeared

during the last few months in such publications as Reader's Digest and Parents Magazine.

Background of Related Research

Intelligence and Creativity are not the Same Thing

It has become generally accepted by researchers that high intelligence as measured by I.Q. tests, and creative ability, are not the same thing, although, of course, they may be found in the same person.

Guilford (1950, p. 447) states, "When we look into the nature of intelligence tests, we encounter many doubts concerning their coverage of creative abilities...An examination of the content of intelligence tests reveals very little that is of an obviously creative nature. Binet did include a few items of this nature in his scale...Group tests of intelligence have generally omitted such items entirely." Guilford's conception of intelligence is based on a factorial theory. Through factorial analysis he has defined some forty or so different intellectual factors. He feels that the typical intelligence test measures perhaps not more than a half dozen of these and that there are also probably several non-intellectual factors which contribute to success. He mentions as some of the thinking factors that are more

obviously creative in character: sensitivity to problems; fluency (the ability to produce a larger number of ideas); ability to produce novel ideas; flexibility of mind; a synthesizing ability; an analysing ability; an ability to organize and redefine; and an ability to re-evaluate. There are probably other additional factors. Guilford also recognises that creative productivity is undoubtedly dependent upon primary traits other than abilities - factors such as motivation and temperament.

L. L. Thurstone (1952, p. 20) asserts, "To be extremely intelligent is not the same as to be gifted in creative work. This may be taken as an hypothesis."

John E. Anderson (1958, p. 19) discussing The Nature of Abilities states that

> ...within a group of brighter children some separation can be made of those who are essentially orthodox and conformist in their intellectual processes and those who are not. We must be careful here not to confuse social conformity with intellectual conformity. Irrespective of social conformity, some who score very high on tests are ideationally very conforming and accepting, while others are questioning and search continually for new formulations. Some who score

> very high on intelligence tests are in life situations, not only satisfied with routines but show little tendency to break away from routine types of thinking or to manipulate ideas logically or creatively. Whether these tendencies are habits that grow out of earlier experience or are characteristics which differentiate types of thinking is not yet clear.

Getzels and Jackson have emphasised that understanding of gifted children, those who do achieve or produce, has been limited by a "too heavy reliance on the concept of intelligence as reflected in the intelligence test." They state that (1962, p. 3)

> Although the correlation between the I.Q. and learning is positive - and we ought to say at once that we recognize the I.Q. as probably the best single measure we have - it nevertheless, rarely accounts for more than one quarter of the variance in such crucial factors as school achievement and academic performance...Moreover, it is commonly observed that many children who are very high in intelligence as measured by I.Q. are not concomittantly high in such other intellectual functions as creativity, and many children who are very high in creativity are not concomittantly high in

intelligence as measured by I.Q.

E. P. Torrance (1962), in discussing deficiences of traditional I.Q. tests, points out that emphasis in such tests has been on the convergent, conforming type of thinking. He mentions a comment by I. A. Taylor at the Third (1959) University of Utah Research Conference on the Identification of Creative Scientific Talent, to the effect that intelligence is "an invention of Western culture" and that it selects and stresses the values important in our society. Torrance discusses other deficiencies such as over-emphasizing certain academic values because they have been important in the past and considering talent, creativity and ability to conform as being the same thing or necessarily found in the same person. A limitation found especially on group tests of intelligence is the restriction on divergent thinking imposed by multiple choice type questions. No allowance is made for unique ideas though they may be correct.

Torrance and his associates at the University of Minnesota, following a similar procedure to one used by Getzels and Jackson, (1962) found comparable results. Both procedures were as follows: Two groups of children were differentiated - a highly intelligent group ranked in the upper twenty per cent on the Stanford Binet but not on creativity; a highly

creative group ranked in the upper twenty per cent on creative thinking tests but not on intelligence. Though the overlap was small, those who were in the upper twenty per cent on both were eliminated. It was found that if children were identified as gifted on the basis of intelligence tests alone, approximately seventy per cent of the most creative would be eliminated. Although there was an average difference of over twenty-five I.Q. points between these groups, there were no statistically significant differences in any of the measures of school achievement (e.g. Gates Reading, Iowa Basic Skills) used. Personality and environmental factors were not considered in this study.

Characteristics of the Creative Person

Although there have been numerous and varied studies done in attempts to investigate the personality characteristics of creative individuals, not many of them have dealt with children.

One study by Weisberg and Springer (1961) of gifted fourth graders, rated highly creative children significantly higher on strength of self-image, ease of early recall, humour, availability of Oedipal anxiety and also uneven ego development.

E. P. Torrance (1962, p. 66) has compiled a list of eighty-four characteristics which, in one or more studies, have been found to differentiate highly creative individuals from less creative ones.

Among the characteristics listed by Torrance the following seemed of particular interest in the present study; a tolerance of ambiguity; a tendency to question authority; a non-conforming or divergent manner of thinking; an ability to withdraw, be alone, not dependent on others.

Studies by Torrance (1962, p. 78) of family and school situations indicate that the creative child is often not the favorite of either teacher or parents. Teachers and peers agree in nominating him most often for having wild or silly ideas. Their work is characterised by ideas "off the beaten track" or "outside the mold" and also by humour, playfulness, relaxation and lack of rigidity.

Carl Rogers feels that the individual creates primarily not because of any likely material reward but because it satisfies some need within himself. He mentions (1954, p. 249-260) three inner conditions necessary for constructive creativity: 1) an openness to experience which means lack of rigidity, permeability of boundaries in concepts, beliefs, perceptions, and hypotheses which implies a tolerance of ambiguity, an ability to receive conflicting information without the need to resolve the conflict immediately; 2) an internal locus of evaluation; the value of a person's creative acts is established not by the praise or criticism

of others but by himself, 3) the ability to "toy" with or manipulate elements and concepts.

Cross-cultural studies being carried out by Torrance and his associates indicate varying developmental patterns in other cultures. Thus far in the study, one of the conclusions would seem to be that there is a relationship between the development of creativity in the individual and cultural influences and discontinuities. The indication seems to be that in cultures which have a high degree to continuity, the development of the creative abilities also shows more continuity. For example the drop in the developmental curve at the grade four level may be related to the increased pressure felt by the child as he moves from the primary grades to the intermediate grades where different methods are used and different demands are made.

Developmental Curves

The literature concerning the stages of creative development offers several interesting observations. Early in this century Kirkpatrick (1900) found that children in the first three grades are more imaginative than children in the fourth, fifth and sixth grades. Simpson (1922) found a low point at the beginning of the third grade with an increase by the end of the year followed by an upward trend with a peak during the second half of grade six.

Mearns (1931) stated that creative activity enjoys free expression during the first three grades with some remaining in the fourth and fifth grades and then a rapid decline in the sixth and seventh grades.

Wilt (1959) describes a decline in creativity occurring about the fourth grade during what she calls the "stage of realism" and "gang age". She feels that this decline is due to a need to conform to peer group standards and she reports that much of the freedom of expression and thinking disappears and in art more emphasis is placed on clothes, symbols become stiff and male and female roles assume importance. She feels that it is only an unusual child that is able to resist the pressures to conform at this stage.

It will be seen that although the general trends are similar some discrepancies occur. There are several explanations. Although many workers have made observations concerning the development of creative thinking abilities, these have usually been only observations not systematic investigations and have often not been carefully documented. A wide variety of measures of creativity have been used and also widely varying samples have been studied. Studies have been mainly corss-sectional and have usually been limited to relatively short spans of time, for example, the pre-school years or the early shcool years. Therefore there is only

limited continuity. It is only recently that any uniform measures which may be used over the whole age range have been developed.

As with all interpretations of age-level characteristics, certain cautions must be observed. Although it is possible to identify certain prominent characteristics within a particular age group, allowance must always be made for individual differences. Rather than looking for a norm of average behaviour at any particular age, it is preferable to look for the range of possible behaviour.

The group working at the Minnesota Bureau of Educational Research have made an attempt to develop tasks suitable for studying creative development over a wide age span. Growth curves have been developed for grades one through twelve and the graduate level. The general pattern of most of the creative thinking abilities so far studied is as follows: a steady increase from the first through the third grade; a sharp decrease between the third and fourth grade followed by some recovery during the fifth and sixth grades; another drop between the sixth and seventh grades followed by growth until the end of high school years. A major exception is the ability to formulate causal hypotheses. Although it begins to develop slowly, it continues without the slump at the beginning of grade four.

Possible explanations for this developmental phenomenon may be found in many places in research and theory in child development. Harry Stack Sullivan (1953) sees a transition period occurring between third and fourth grades during which time the child is acquiring the skills of social subordination and accommodation, ostracism, and compromise. He feels that by this time a careful sorting out of that which is agreed to by authorities has been accomplished and unusual ideas are laughed at, ridiculed, condemned. Others are seen as sources of ridicule, and humiliation; therefore communication with others becomes restricted, less free and easy.

From an educational point of view, new stresses are occurring at this period as the child moves from primary to intermediate grades. Such periods of new stress are generally accompanied by a decreased performance. Maslow (1954) has used a hierarchy of needs which must be satisfied in order to allow the individual to move forward in growth. He feels that as a child's safety needs are satisfied, higher needs and impulses are permitted to emerge. Where a situation is admiring, praising, accepting, safe, gratifying, reassuring, supporting, unthreatening, non-valuing, non-comparing, then the person is free to work out and express

other feelings and drives. But society, in terms of both peer groups and school-room situation and likely also parental pressures, seem to suddenly make extra demands on children at this particular age.

E. P. Torrance (1961) has reported on a continuing study investigating factors affecting the development of creative thinking abilities in children. He has found that the factors in nature and society which affect this development include: 1) the educational level at which the child is, 2) different ways of handling and different behaviour expected from boys as opposed to girls, 3) premature attempts to eliminate phantasy, 4) restrictions on manipulativeness and curiosity, 5) conditions resulting in both fear and timidity in authority and peer relations, 6) misplaced emphasis on certain verbal skills, 7) over-emphasis on prevention of error and emphasize the need for success, 8) lack of resources for working out ideas; children are taught what to think rather than how to think.

A Study of Group Pressures

In The Influence of the Group on the Judgments of Children, Ruth W. Berenda (1950) uses simple perceptual material in an experimental situation designed to consider the effect of majority opinion on children. Briefly, her

results indicate that when an individual child is confronted with a majority of his own classmates giving unanimous, incorrect responses on simple perceptual material, there is a statistically significant change in the judgments of the experimental children in the direction of the group, she found no significant relation between I.Q. and "following".

The Problem

Several implications which are significant to the present research emerge from this background material. The creativity of an individual is as likely as is his intelligence to influence the use he makes of his abilities. Persons who are highly creative tend to be able to accept the tension of conflicting information more easily, they are more inclined to give unconventional responses; they worry less about what others will think; they have a stronger and better developed self-image; they will conform less to group pressure.

The purpose of the present research is to study the relationship between creativity and children's reaction to group pressure. The hypothesis considered is that children who score in the top 20 per cent in their grade level on tests of creativity are less likely to give incorrect answers on a simple perceptual test, in order to conform with answers

being given by their peers, than are children who score below 60 per cent on the creativity tests.

C H A P T E R II

METHOD

Subjects

One hundred and sixty-eight children in grades two through six of a Windsor public school were used in this study. They ranged in age from seven to twelve years and included both boys and girls. Table 1 gives a summary of data concerning these children.

Table 1

Number of Subjects in Each Grade, Number of Boys and Girls in Each Grade.

Grade	No. of Subjects	No. of Boys	No. of Girls
2	24	11	13
3	28	11	17
4	33	20	13
5	39	22	17
6	44	23	21

Selection

Two tests were administered to all the subjects as criteria to be used in selecting the four experimental groups. These two tests were the Abbreviated Form VII of

the Minnesota Tests of Creative Thinking and the Dominion Group Test of Learning Capacity, Form B. Further description of these tests may be found in Appendix B.

In grades four, five and six, the four sub-tests of the Creative Thinking Battery were administered as a group test with each child writing down his own answers. In grades two and three the two sub-tests which required verbal responses were administered individually in order to eliminate any handicap which the mechanics of spelling and writing (or printing) would impose on the child. The tests were scored and placed in rank order for each grade separately. I.Q. scores for all pupils were also computed and listed together with the creativity score.

On the basis of these two tests, four groups were chosen. Group A was composed of children who scored above the 80th percentile in their own grade on the Minnesota tests and received an I.Q. score of 118 or above. Group B was composed of children who scored above the 80th percentile on the creativity tests but who received an I.Q. score between 98 and 114. Group C was composed of children who scored below the 60th percentile on the creativity tests and received an I.Q. score of 118 or above. Group D was composed of children who scored below the 60th percentile on the creativity tests and received an I.Q. score between 98 and 114.

Each of the four groups contained 13 subjects. The total number of subjects included an equal number of boys and girls although there were not equal numbers in each group. Table 2 shows the number of each sex in each group. Any child who was displaced, because of illness; retardation or emotional problems, more than one grade for his age was excluded because any of these variables might also have affected his creativity.

Table 2

Number of Boys and Number of Girls in Each of the Four Experimental Groups, A,B,C, and D.

Group	Boys	Girls
A	8	5
B	6	7
C	7	6
D	5	8

Test of Conformity

A simple perceptual test was used in the experimental situation as a means of testing for conformity. This perceptual test was adapted from R. Berenda's test (1950). Twelve pairs of white cards, eighteen inches by six inches were presented on a blackboard ledge where they were placed

three feet apart. One card of each pair, the standard, contained a single balck line one quarter inch wide and the other card, the comparison, contained three black lines, one of which was equal in length to the line on the standard card. The directions were as follows: "I have here at the right one line. On the other side, I have a card with three lines. You see that the three lines are not the same size. You also see that the lines are numbered one, two and three. There is one line that is just as long as the one line on this card (pointing to the standard). When I put up the two cards you will write your answers on your paper."

All pupils in the five grades, including the subjects selected for the experimental groups, were given this perceptual test and, on the basis of these results, eight judgments which were among the easiest to make were selected to be used as ones to which the "majority" would give incorrect responses during the experimental situation, thus providing a pressure situation in which to observe the reactions of the experimental subjects. Table 3 gives the data concerning the perceptual test.

Design of the Experimental Situation

A group of six children, three boys and three girls, in each grade was selected to act as the "majority" group

during the experimental situation. A sociometric technique was used to identify children with whom classmates did not wish to associate and who would therefore be unsatisfactory as members of the majority group. The technique was as follows: the children in each grade were asked to pretend that the next day was their birthday and their mother had said they could invite one friend to go to the show (movies) with them. They were told to write down the name of the one person in their class that they would invite. They were then told that it turned out that friend could not go and so they were to write down the name of the person they would invite instead. Again that person could not go and they were told to pick another friend. The results of these choices were tabulated, three points being given for a first choice, two for a second and one for a third. In choosing the children for the "majority" group, those who received the highest scores (excluding pupils already chosen for the four experimental groups A,B,C and D) were chosen.

The purpose of the "majority" group was to give incorrect answers to the eight judgments on the perceptual test which was administered again. Each of the experimental subjects took the perceptual test a second time in company with the "majority" group from his own classroom. The answers of each of the experimental subjects was recorded to determine

Table 3

Lengths of Standard and Comparison Lines, the Per Cent of Correct Judgments made by the Subjects on the First Presentation, the Responses of the "Majority" Group in the Experimental Situation.

	Length of Standard Line (Inches)	Length of Comparison Lines (Inches) 1	2	3	Correct Answer	% of Answers Correct	Group Answer
1	3 ½	3 ¾	5	3 ½	3	79	3
2	9	7	9	11	2	60	2
3	7 ½	5	5 ¾	7 ½	3	100	2
4	5	6 ½	7	5	3	94	1
5	3 ¾	2 ¾	3 ½	1 ¾	3	99	3
6	8	8	7	6	1	94	2
7	1	3	1	2 ¼	2	100	3
8	8 ½	8 ½	10 ¼	11	1	55	1
9	5 ½	4 ½	5 ½	4	2	99	3
10	2 ½	4	2 ½	3 3/8	2	99	3
11	4 ½	4 ½	3 ½	5 ½	1	80	3
12	6 ½	6 ½	5 ¼	7 ½	1	94	3

numbers underlined are incorrect answers as given by the "majority" group at the request of the examiner.

the number of times he "followed" the "majority" group in answers given, that is, the number of times he conformed to the pressure of the group.

A Two-way analysis of variance technique was used to determine whether there was significantly less "following" by the children who scored above the 80th percentile than by the children who scored below the 60th percentile, with the intelligence factor controlled.

Procedure

On the day that the testing was to be done to determine which of the children would "follow" the "majority" group in giving incorrect answers, the teachers were requested to send the "critical" subjects, i.e. those children chosen for Groups A,B,Cor D, to the school library with work to occupy themselves. After they left the room, the "majority" group were sent to another room where the experimental testing was to be done. They were instructed thoroughly about the procedure to be followed. They were told they would be taking the perceptual test again; they were requested to give incorrect answers to eight of the judgments. They were given practice on their responses and the way in which they would be made. See Appendix B for the instructions used.

They were instructed to sit in a particular order with a space left between the fifth and sixth child for the classmate who sould join them for the test. The child who was to sit in the first chair was given the answers that were to be used and all the other children were instructed to give the same answers as he did.

The "majority" group was then asked to return to the hall and pretend to be arriving at the testing room at the same time as each individual "critical" subject was brought to the room from the school library.

The perceptual test was then presented with these modified directions - "You will remember I showed you these lines before. I have here at the right one line. On the other side, I have a card with three lines. You see that the three lines are not the same size. You also see that the lines are numbered one, two and three. There is one line among these three that is just as long as the one line on this card (pointing to the standard). When I put up the two cards, you will not write your answers as you did last time, but each of you will give your answer out loud." Although a pretense was made at recording the answers of all the children, only the answers of the "critical" child each time were actually recorded.

C H A P T E R III

R E S U L T S

Figures 1 to 5 illustrate the distribution of scores for each grade on the Abbreviated Form VII Minnesota Tests of Creative Thinking. The 80th percentile and the 60th percentile for each grade is indicated. These were the cut off points used in selecting the four experimental groups.

The scores received by grade 2 and 3 pupils were generally higher than for the other three grades. The scores in grades two and three also covered a wider range.

The medians for each grade were also calculated. Fig. 6 shows the curve for the median score obtained at each grade level. This curve follows very closely the developmental curves that Torrance and his associates have found for most of the creative thinking abilities.

Tables 4 to 7 summarize the information concerning the subjects in each of the four groups selected - the I.Q. scores, scores on the test of creative thinking, age, grade, sex and the number of times they followed the "majority" in giving answers during the experimental situation.

The results of the analysis of variance for the four groups indicated the differences in the number of times subjects in each of the four experimental groups followed the "majority" group. The difference in the "following" scores was not significant for either the intelligence factor or the creativity factor.

Although there was an equal number of boys and girls in the total number of subjects, there was not an equal number in each of the four groups. On inspection of the "following" scores, it seemed that the differential sex factor had some effect. Therefore a co-variance adjustment, which would make allowance for the sex factor, was calculated. This adjustment brought the means for the groups closer together. Table 8 gives the results for the analysis of variance and the co-variance adjustment.

Fig 7 shows the relationship of the mean following scores to each other, both before and after adjustment. The original means were; Group A 1.92, Group B 3.31, Group C 3.15, Group D 4.62. The adjusted means were: A 2.16, B 3.23, C 3.23, D 4.38. In both ranges of I.Q. (ninety-eight to one hundred and fourteen, and one hundred and eighteen and above) the pupils who scored above the 80th percentile on the creative thinking tests followed less often than

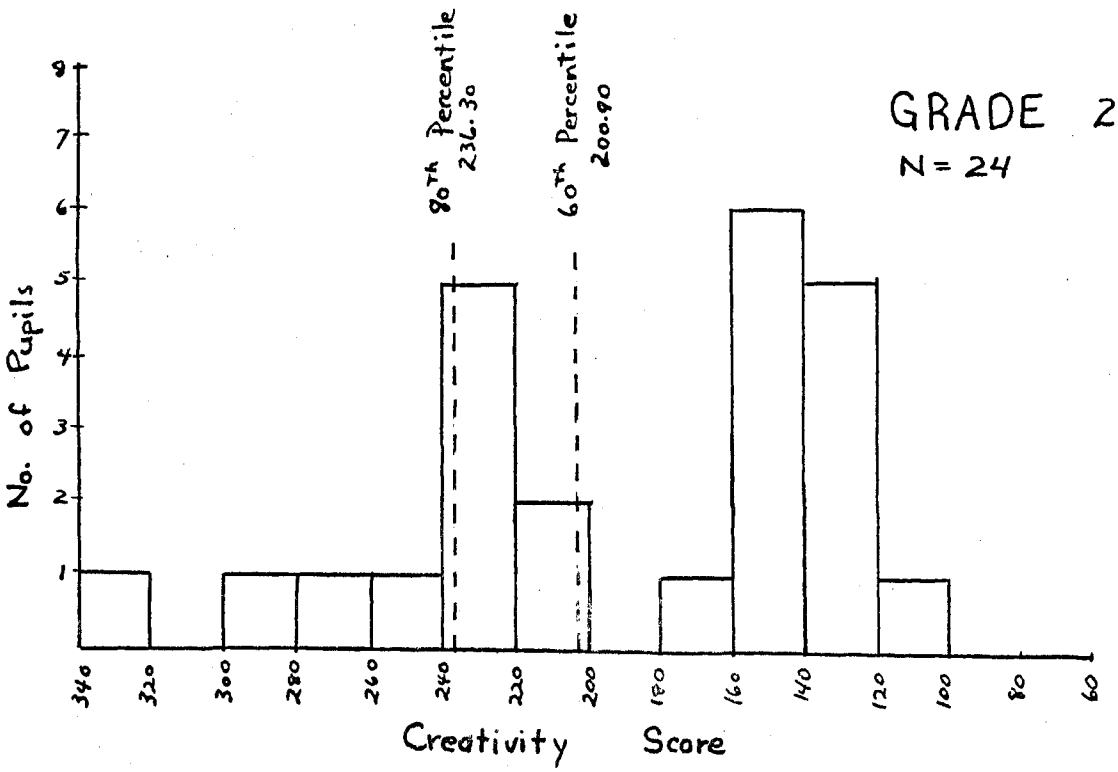


Fig. 1. Distribution of the Scores on the Minnesota Tests of Creative Thinking, Form VII.

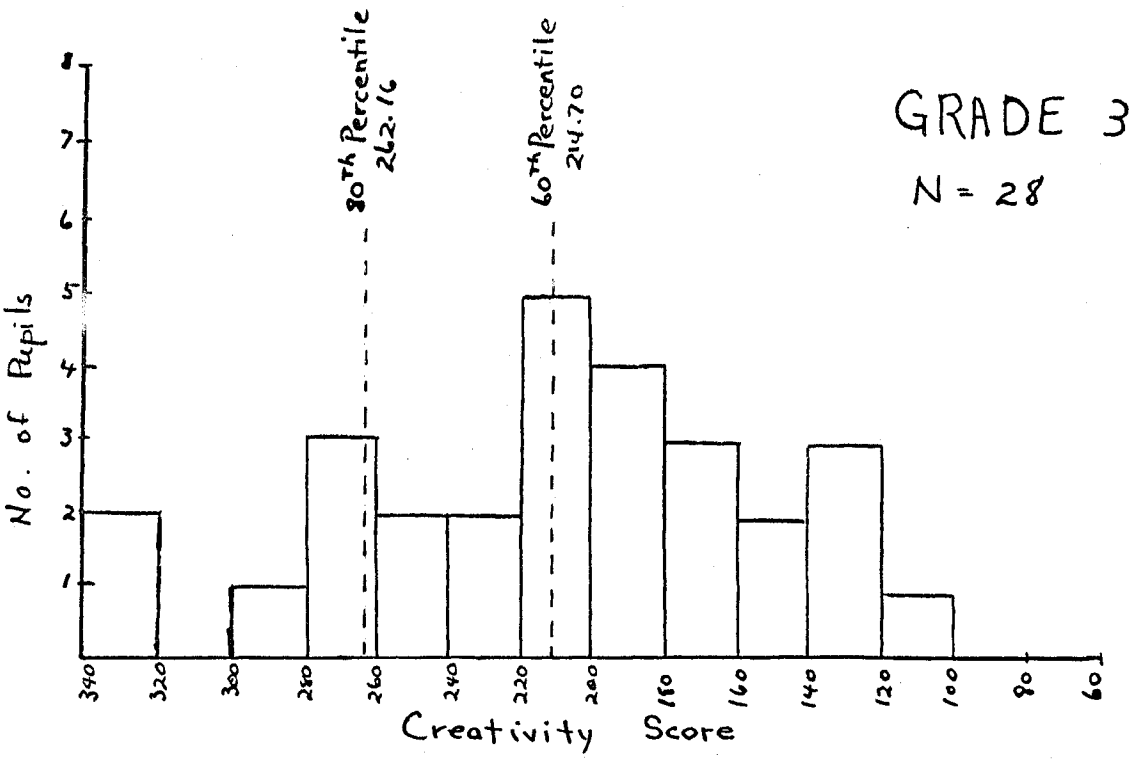


Fig. 2. Distiribution of the Scores on the Minnesota Tests of Creative Thinking, Form VII.

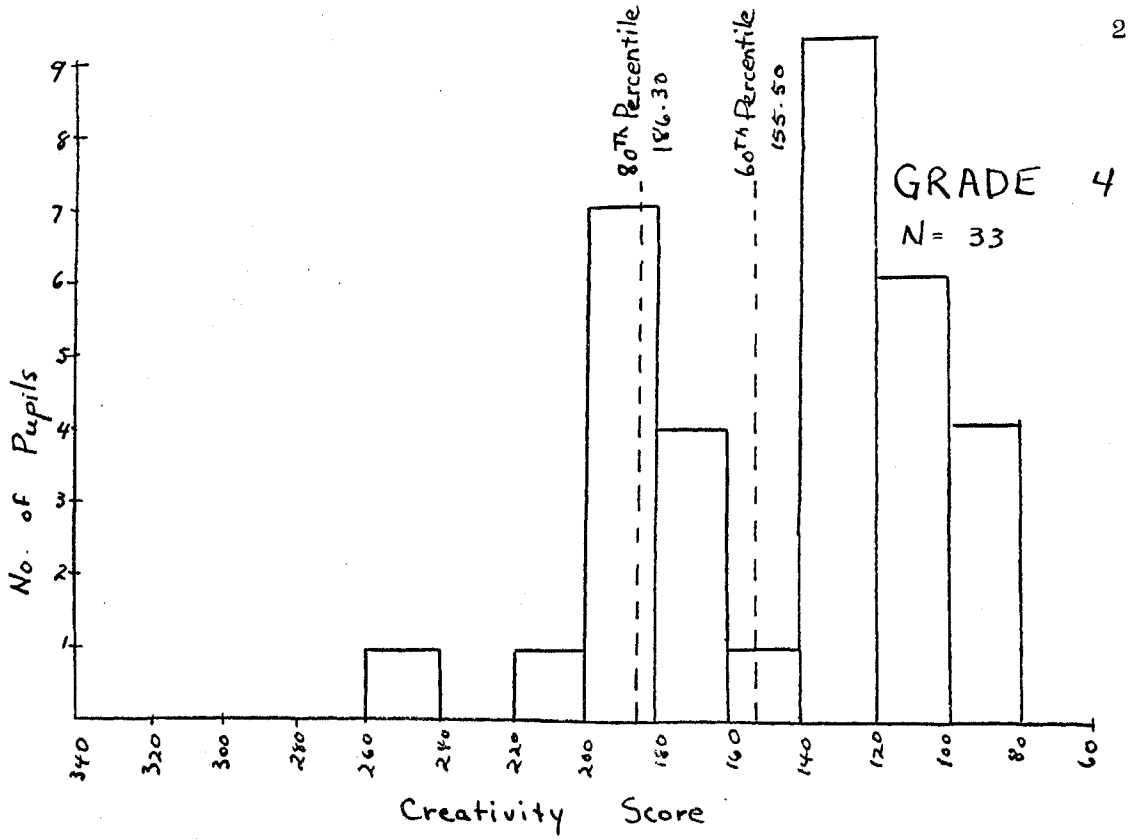


Fig. 3. Distribution of the Scores on the Minnesota Tests of Creative Thinking, Form VII.

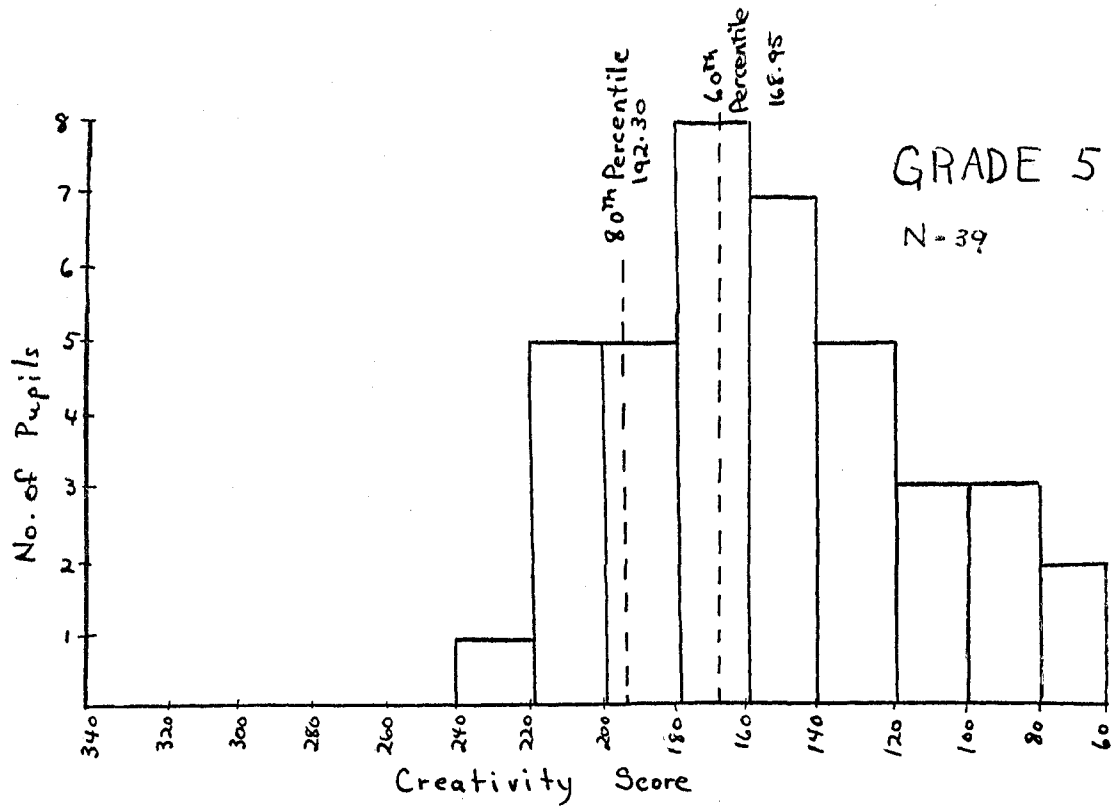


Fig. 4. Distribution of the Scores on the Minnesota Tests of Creative Thinking, Form VII.

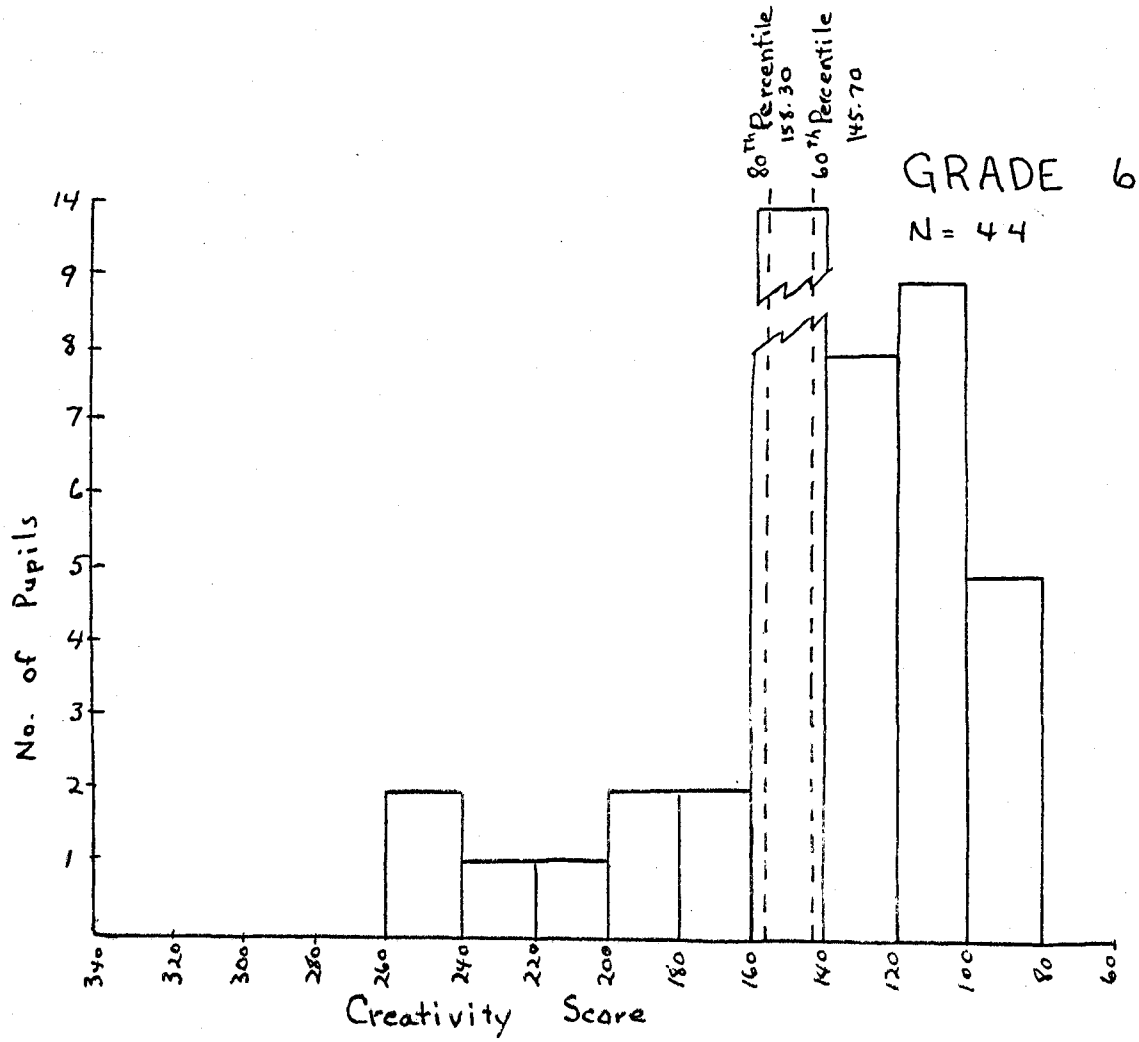


Fig.5 Distribution of the Scores on the Minnesota Tests of Creative Thinking, Form VII.

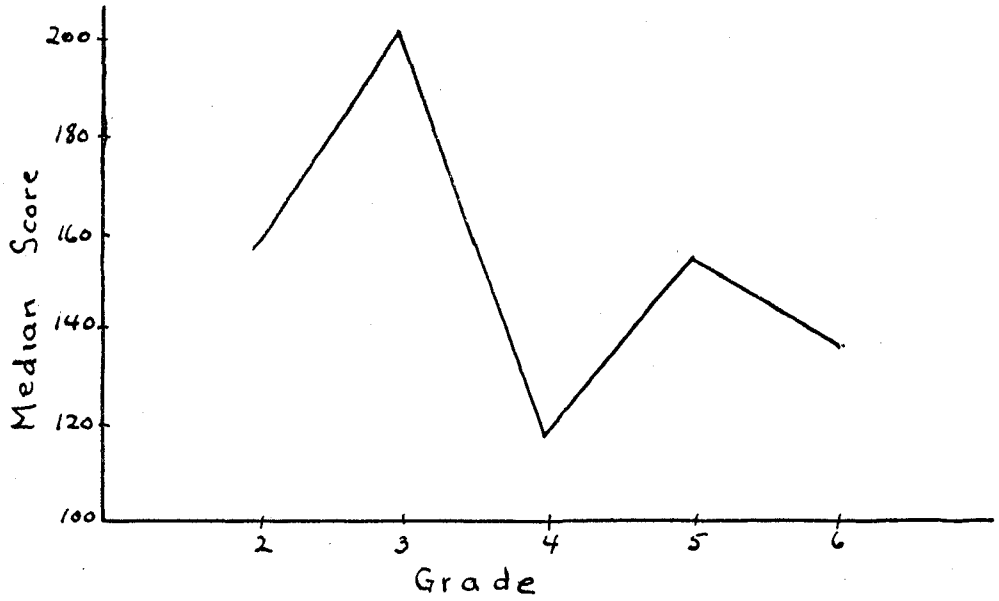


Fig. 6 Median Scores for Each Grade on the Minnesota Tests Creative Thinking.

Table 4

Data Concerning the Subjects in Experimental Group A

Subject	Creativity Score	I.Q.	Age	Grade	Sex	Number of Times "Following"
1 (1)	331	121	7-7	2	F	1
2 (2)	287	122	7-4	2	M	0
3 (7)	233	118	8-0	2	F	1
4 (5)	239	118	7-1	2	M	1
5 (25)	340	118	8-0	3	M	4
6 (53)	256	119	9-7	4	M	0
7 (54)	217	119	9-11	4	M	3
8 (55)	199	118	9-8	4	M	1
9 (56)	199	136	9-5	4	F	1
10 (94)	193	119	10-1	5	M	0
11 (95)	194	121	9-8	5	F	8
12 (91)	204	118	10-0	5	M	4
13 (134)	165	126	10-1	6	F	1

Numbers in brackets indicate numbering in raw data, Appendix A

Table 5

Data Concerning the Subjects in Experimental Group B

Subject	Creativity Score	I.Q.	Age	Grade	Sex	Number of Times "Following"
1 (4)	259	114	8-3	2	M	0
2 (3)	278	112	7-3	2	F	8
3 (27)	294	111	8-2	3	F	7
4 (29)	272	110	8-0	3	F	8
5 (57)	199	104	9-0	4	F	4
6 (59)	187	100	9-7	4	M	2
7 (61)	186	98	9-2	4	M	2
8 (60)	186	103	9-9	4	F	3
9 (89)	211	110	10-7	5	F	0
10 (87)	218	101	11-0	5	M	1
11 (126)	250	110	11-1	6	F	6
12 (128)	224	112	11-9	6	M	2
13 (130)	188	99	11-5	6	M	0

Numbers in brackets indicate numbering in raw data, Appendix A

Table 6

Data Concerning the Subjects in Experimental Group C

Subject	Creativity Score	I.Q.	Age	Grade	Sex	Number of Times "Following"
1 (22)	124	122	7-4	2	F	8
2 (19)	136	122	7-4	2	M	1
3 (40)	195	118	8-6	3	F	2
4 (48)	144	117	8-3	3	M	6
5 (69)	136	119	9-8	4	M	4
6 (70)	132	119	9-8	4	F	8
7 (83)	93	120	9-1	4	M	2
8 (71)	130	120	9-6	4	F	4
9 (115)	132	131	9-8	5	F	0
10 (118)	107	133	9-5	5	M	4
11 (108)	154	119	10-8	5	M	0
12 (157)	113	127	10-6	6	F	2
13 (166)	82	120	11-7	6	M	0

Numbers in brackets indicate numbering in raw data, Appendix A

Table 7

Data Concerning the Subjects in Experimental Group D

Subject	Creativity Score	I.Q.	Age	Grade	Sex	Number of Times "Following"
1 (12)	170	103	7-4	2	F	4
2 (18)	141	108	7-11	2	M	0
3 (37)	209	108	8-3	3	F	6
4 (35)	214	101	8-6	3	F	7
5 (51)	127	104	8-10	3	M	2
6 (76)	119	105	9-5	4	F	4
7 (66)	142	106	9-6	4	M	4
8 (109)	146	106	10-2	5	M	7
9 (116)	133	107	10-7	5	F	4
10 (117)	133	104	9-10	5	F	3
11 (142)	144	106	10-8	6	F	8
12 (152)	122	109	11-2	6	F	7
13 (158)	111	108	11-3	6	M	4

Numbers in brackets indicate numbering in raw data, Appendix A

those who scored below the 60th percentile. The results illustrated in this distribution is similar to the trend which was expected in setting up this study, although the differences between the groups was not statistically significant.

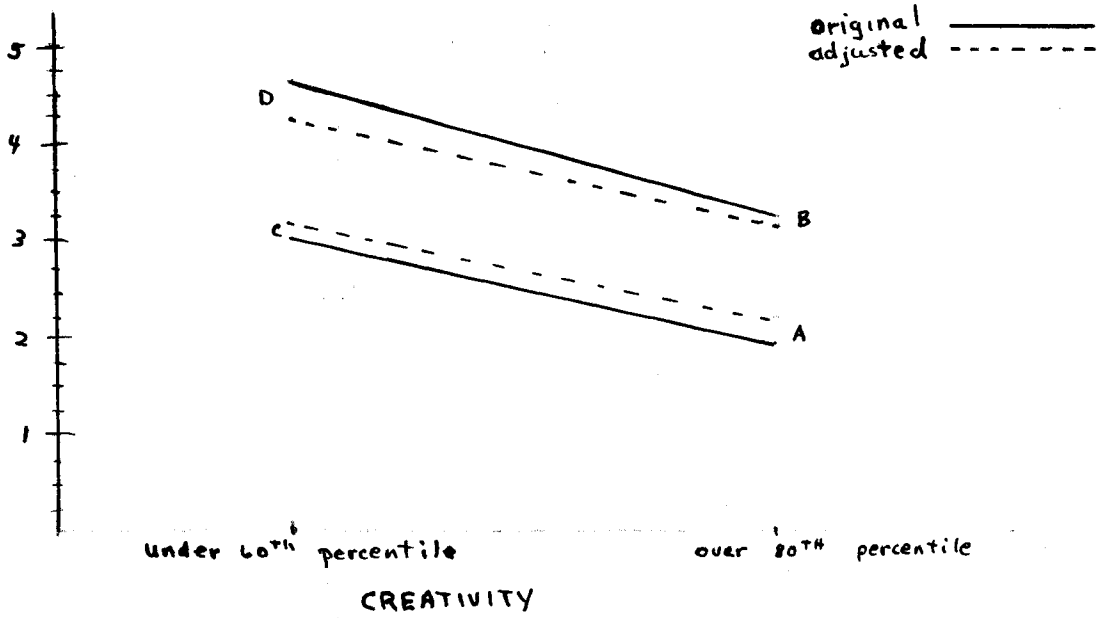


Fig. 7 Relationship of mean "Following" scores for groups A, B, C, and D both before and after adjustment for sex factor.

Since it seemed that the sex factor affected the tendency to "follow", the raw data was reorganized into two groups, boys and girls. The two groups have an equal number of subjects (26) and the mean I.Q. score for the boys was

Table 8

Analysis of Variance and Co-variance Adjustments for the "Following" Scores of Subjects Grouped on the Basis of Intelligence and Creativity.

Source	Sum of Squares	df	Mean Square	F Ratio
Intelligence	26.3269	1	26.3269	4.49
Creativity	20.9423	1	20.9423	3.57
Interaction	0.0193	1	0.0193	1
Error	281.4615	48	5.8638	
	Adjusted			
Intelligence	15.3922	1	15.3922	3.20
Creativity	15.8728	1	15.8728	3.30
Interaction	0.0193	1	0.0193	1
Error	226.2791	47	4.8144	

113.65 and for the girls 113.92 with standard deviations of 8.47 and 9.36 respectively. The mean creativity score for the boys was 181.38 and for the girls 187.77 with standard deviations of 61.58 and 59.48 respectively. The t-test score for the difference between these means was .37 with 50 degrees of freedom. This difference is not significant. The mean "Following" score for the boys was 2.08 and for the girls 4.42 and the standard deviations 1.97 and 2.81. The t-test score for the difference between these means was 3.44 with 50 degrees of freedom. This difference is significant at the .01 level. These results are summarized in Table 9.

Table 9

Means and Standard Deviations for I.Q. Scores, Creativity Scores and "Following" Scores for Boys Group (N=26) and Girls Group (N=26)

	I.Q. Scores Mean		Creativity Scores Mean		"Following" Scores Mean	
Boys	113.65	8.47	181.38	61.58	2.08	1.97
Girls	113.92	9.36	187.77	59.48	4.42	2.81

In general, then, the distribution of scores on the creativity test at the various grade levels was similar to distributions of most creative thinking abilities found by Torrance and his associates. Although the trend shown by the "following" scores of the four groups chosen on the basis of intelligence and creativity is similar to the hypothesized effect, the differences were not large enough to be statistically significant. On the other hand, when the total number of subjects was divided into two groups on the basis of sex, it was found that although there was no significant difference between them on intelligence or creativity, there was a statistically significant difference on the "following" scores.

C H A P T E R IV

DISCUSSION AND CONCLUSION

Discussion

Several points might be mentioned concerning the distribution of creativity scores. The grade two and three pupils tended to score higher, generally, than those in the other three grades. Since two of the four sub-tests were administered individually to the grade two and three pupils, it may be that the higher scores could be accounted for on this basis. The examiner wrote down their answers for them whereas the grade four, five and six pupils were required to write down their own answers.

In his introduction in the manual of directions for use with this form of the tests of creative thinking, Torrance mentions the need to recognise that many individuals will be handicapped by group, written administration even at the adult level but that some find it easier to give written answers than oral ones. He does not state specifically what studies have been made in connection with this problem of administration. It would appear that the difference

in administration could be affecting the developmental curves to some extent, and that further work should be carried out in this area.

A comparison of Fig. 8 and Fig. 9 shows that the developmental curve obtained in this study corresponds closely with a typical curve obtained by E. P. Torrance. Fig. 8 gives the graph plotted from the median scores for each grade on Form VII, Minnesota Test of Creative Thinking. Fig. 9 is the curve plotted for the mean frequency of questions asked on Part 1, Ask-and-Guess Test obtained by Torrance (1962, p. 93). He cites this curve as fairly typical of the general pattern of the developmental curves of most of the creative thinking abilities that he and his associates have assessed. The units of measurement for the ordinates of the two graphs differ and therefore are not directly comparable. However it will be seen that the general trends at each of the grade levels are similar, with one exception. Torrance's developmental curves show a steady increase from the first through the third grade, a sharp decrease between the third and fourth grade followed by some recovery during grade five and six, with a drop again between grade six and seven. In the present study the curve is similar except that the second drop occurs between grade five and six. This difference could reflect some

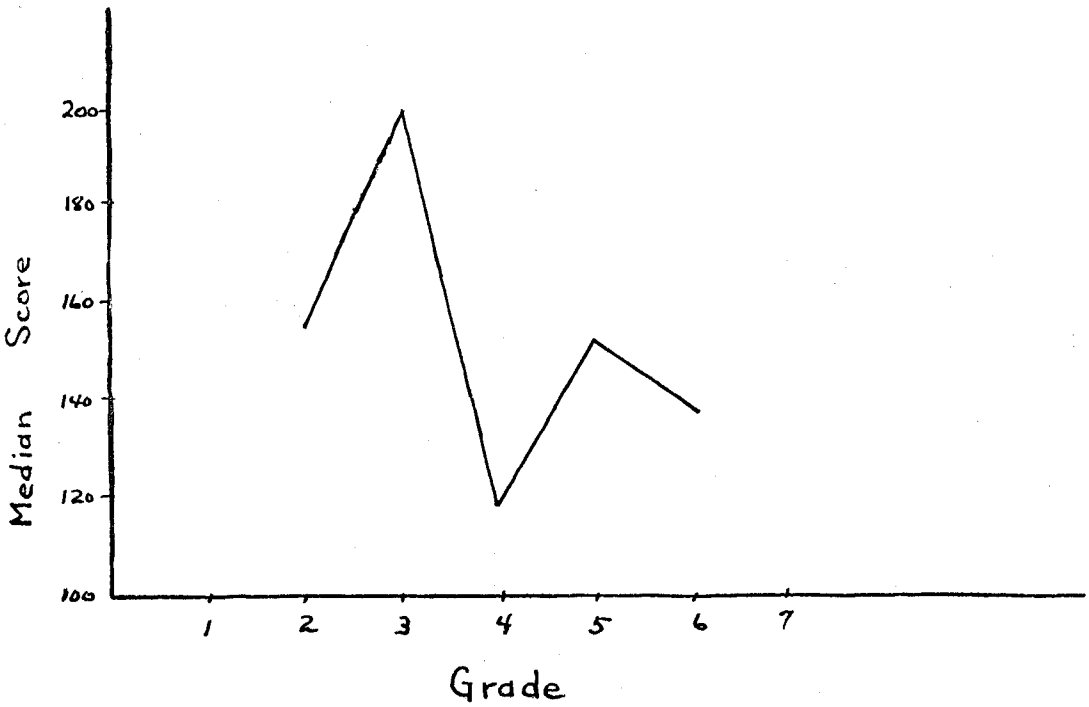


Fig. 8. Developmental Curve for Median Scores on Minnesota Tests of Creative Thinking, Form VII, Obtained in this Study.

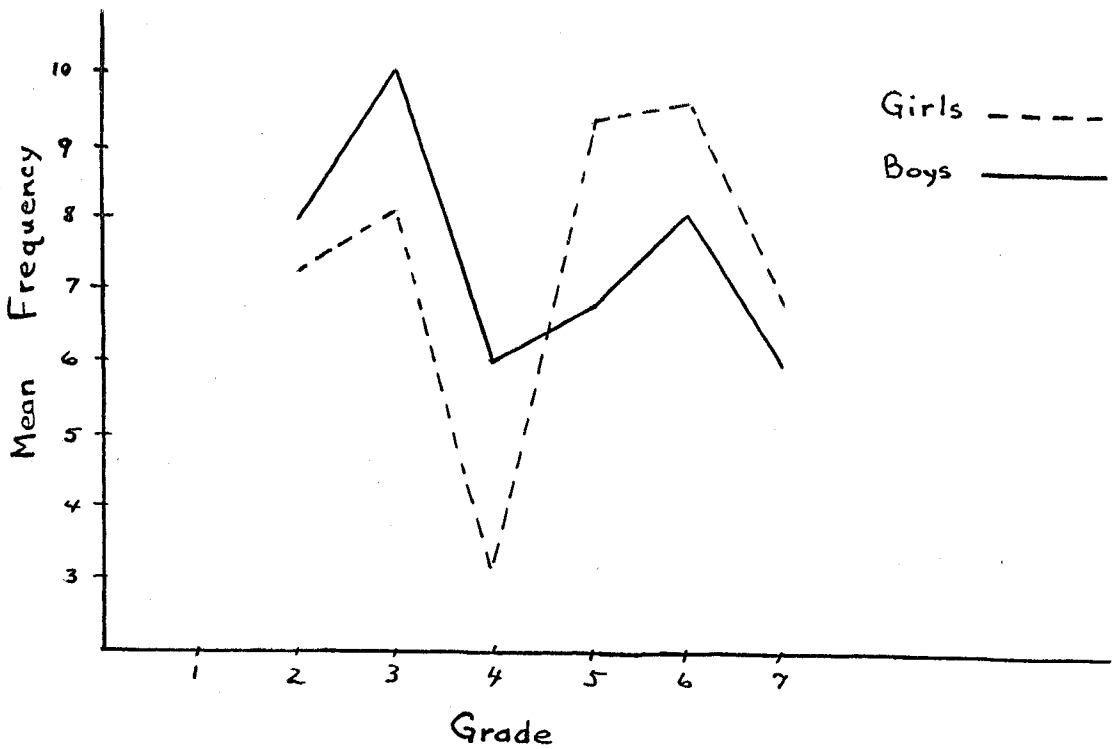


Fig. 9. Developmental Curve for Mean Frequency of Questions Asked on Part 1, Ask-and-Guess Test, E.P. Torrance.

specific environmental or cultural pressure - for example, a stricter emphasis on academic conformity, or a less progressive type of curriculum in Windsor schools. Stoddard's comment (1957, p. 181) would support this idea. He states: "Creativity came close to being a lost cause in American education. Progressive education, a phenomenon rarely observed in pure form, helped to revive its spirit...The urge to inquire, to invent, to perform was stifled in millions of school children." If education in Windsor schools, or in this particular school or even this one classroom, is less progressive, perhaps the earlier slump in the creativity scores can be accounted for on this basis. The difference in the curve obtained in this study could be simply a function of this particular sample of children. In any case the general over-all agreement with Torrance's results would suggest that the Minnesota Test of Creative Thinking, Form VII was applicable and useful in this situation and was measuring the same or similar aspects as it did in the development of the test.

The narrower ranges of creativity scores at the higher grade levels, as seen in Table 10, suggest that the older children are more inclined to a homogeneous grouping that are the younger ones. The distribution of the grade six

scores shows three-quarters of the subjects grouped together in less than half the range. This trend would need to be investigated further in groups with well-controlled samplings, uniformity of intelligence and when it has been definitely determined that these tests are reliable at each level and measuring the same thing at every age. Longitudinal studies following the same children through all age levels will point up these factors.

Table 10

Comparison of the Ranges of Scores, the Medians and Interquartile Range at Each Grade Level on the Minnesota Tests of Creative Thinking

Grade	Range	Median	Interquartile Range
2	333-102 (229 pts.)	159.50	231.50 - 139.50
3	340-111 (229 pts.)	203.50	249.50 - 166.16
4	256- 80 (176 pts.)	123.94	181.64 - 115.70
5	235- 70 (165 pts.)	158.07	184.50 - 126.50
6	250- 80 (170 pts.)	139.50	155.21 - 112.83

The hypothesis that children who score in the top twenty percent in their grade level on tests of creativity are less likely to give incorrect answers on a simple perceptual test in order to conform with answers being given by their peers, than are children who score below sixty per cent, is not

confirmed by the results of this study. Although the trend lies in the hypothesized direction, the dirrerences in "following" were not statistically significant. If we accept the premise that the Minnesota Tests of Creative Thinking are actually pointing up creativity, then it would seem that some other factor in the children's background is also influencing their ability to resist group pressure in this situation. From the results of the present study it appears that intelligence alone is not the determining factor either. Perhaps some other personality factor or environmental background factor influences the child's ability to act independently. Further study with more precise controls is needed. The use of a personality test as a criterion of selection of subjects would be helpful and some investigation of parental attitudes and approaches which might be influencing the child's behaviour such as over-criticalness, suppression of imagination would also lead to a more adequately controlled sampling.

The analysis of the results of this study on the basis of sex, indicates a significant difference in the amount of "Following" done by boys and girls. The girls, even though of similar intelligence and creativity are influenced much more by peer pressures in the present study than are the boys. It would be of interest to try to determine if this situation is the result of over-emphasis or misplaced emphasis on sex roles by our society. Girls and

boys are treated differently and expected to behave differently. We tend to look for and promote sensitivity in girls and independence in boys.

In the present study, the group pressure is perhaps taken by some or all of the pupils as a social situation rather than an intellectual one. As J. E. Anderson's statement, which was referred to on page three, suggests, we should avoid confusing the two types of situation. Perhaps the girls and even some of the boys who scored high on "following" interpreted it as a social situation in which the task was to discover what the group was doing. The simplicity of the perceptual task perhaps did not make it seem like an intellectual situation. Some follow-up discussion with each subject would possibly have enabled the examiner to determine how they viewed the situation. From this point of view, the greater amount of "following" by the girls could be a function of greater social sensitivity rather than inability to resist group pressure.

Conclusion

Although the results of this study indicate a trend in the hypothesized direction, they do not permit us to say that either creativity or intelligence will determine whether a child will yield to the pressure of a group of

his peers giving incorrect answers on a simple perceptual test.

It does appear that boys do not yield to group pressure as easily as girls do. Further study which was set up to investigate this apparent trend would need to be done to determine the dynamics involved.

Results obtained in this study in connection with the distribution of creativity scores at the grade two to six grade level, tend to confirm results obtained by Torrance on the development of creative thinking abilities in children.

APPENDIX A

Individual Scores Obtained on the I.Q. and Creativity Tests

	Subject	I.Q.	Creativity Score	Sex
Grade 2	1	121	331	F
	2	122	287	M
	3	112	278	F
	4	114	259	M
	5	118	239	M
	6	91	238	M
	7	118	233	F
	8	93	232 80th percentile	M
	9	116	228	F
	10	114	207	F
	11	82	201	M
	12	103	170	F
	13	102	157	M
	14	111	153	M
	15	111	149	F
	16	99	146	M
	17	95	142	F
	18	108	141	M
	19	122	136	M
	20	111	135	F
	21	110	133	F
	22	122	124	F
	23	99	120	F
	24	105	102	F
Grade 3	25	118	340	M
	26	100	327	F
	27	111	294	F
	28	70	275	F
	29	110	272	F
	30	99	269 80th percentile	M
	31	104	254	F
	32	91	252	F
	33	84	235	M
	34	104	224	F
	35	101	214	F
	36	93	216	M
	37	108	209	F
	38	98	201	F
	39	96	200	F
	40	118	195	F
	41	126	195	F
	42	103	184	F
	43	107	180	M
	44	113	179	M
	45	97	172	M

A P P E N D I X A (cont'd)

Individual Scores Obtained on the I.Q. and Creativity Tests

	Subject	I.Q.	Creativity Score	Sex
Grade 3 (cont'd)	46	90	166	M
	47	102	154	F
	48	117	144	M
	49	99	135	F
	50	92	129	F
	51	104	127	M
	52	109	111	M
Grade	53	119	256	M
	54	119	217	M
	55	118	199	M
	56	136	199	F
	57	104	199	F
	58	103	197	F
	59	100	187	M
	60	103	186	F
	61	98	186 80th percentile	M
	62	91	165	M
	63	96	163	M
	64	91	162	F
	65	102	160	M
	66	106	142	M
	67	91	137	F
	68	81	137	M
	69	119	136	M
	70	119	132	F
	71	120	130	F
	72	89	130	M
	73	80	128	M
	74	90	126	M
	75	99	122	F
	76	105	119	F
	77	108	116	M
	78	88	115	M
	79	81	111	F
	80	82	109	F
	81	96	109	M
	82	93	97	M
	83	120	93	M
	84	113	82	M
	85	86	80	F

APPENDIX A (cont'd)

Individual Scores Obtained on the I.Q. and Creativity Tests

	Subject	I.Q.	Creativity Score	Sex
Grade 5	86	83	235	M
	87	101	218	M
	88	87	214	F
	89	110	211	F
	90	87	205	F
	91	116	204	M
	92	90	202 80th Percentile	F
	93	96	191	M
	94	119	193	M
	95	121	194	F
	96	113	187	M
	97	115	181	F
	98	110	179	M
	99	89	172	F
	100	111	170	M
	101	92	170	F
	102	106	167	M
	103	77	166	F
	104	79	162	M
	105	116	162	M
	106	119	158	M
	107	102	157	M
	108	119	154	M
	109	106	146	M
	110	110	143	M
	111	95	143	F
	112	118	140	F
	113	101	138	M
	114	125	135	M
	115	131	132	F
	116	107	133	F
	117	104	133	F
	118	133	107	M
	119	111	106	M
	120	101	100	M
	121	75	99	F
	122	119	98	M
	123	117	93	F
	124	115	72	F

APPENDIX A (cont'd)

Individual Scores Obtained on the I.Q. and Creativity Tests

	Subject	I.Q.	Creativity Score	Sex
Grade 6	125	110	250	F
	126	99	240	M
	127	112	224	M
	128	110	200	F
	129	99	188	M
	130	102	184	M
	131	95	170	M
	132	126	165	F
	133	116	158 80th Percentile	F
	134	91	157	M
	135	98	154	F
	136	116	156	M
	137	116	152	F
	138	107	150	M
	139	124	150	M
	140	76	148	F
	141	71	148	F
	142	124	147	F
	143	106	144	F
	144	97	142	M
	145	96	142	F
	146	83	141	M
	147	94	137	M
	148	107	137	F
	149	113	133	F
	150	93	132	M
	151	131	131	F
	152	89	124	M
	153	109	122	F
	154	112	120	F
	155	95	116	M
	156	108	114	F
	157	92	113	M
	158	127	113	F
	159	108	111	M
	160	89	109	F
	161	104	106	M
	162	97	104	M
	163	82	102	M
	164	128	94	M
	165	89	85	F
	166	74	84	F
	167	120	82	M
	168	96	80	M

A P P E N D I X B

Dominion Learning Capacity - Primary Edition

Dominion Learning Capacity - Junior Edition

Abbreviated Form VII Minnesota Tests of Creative Thinking

Instructions used in Preparing the "Majority" Group

The Dominion Group Test of Learning Capacity

The primary edition, used in this study for the grades two and three pupils, is entirely pictorial. There are four sub-tests: a) following instructions b) picture matching c) object matching d) copying dot drawings. The original mental age equivalents were computed in 1944 from results of 933 children and revised norms were computed in 1950 on the results of over 1800 pupils. Reliability coefficients for the two Forms A and B were computed using the Spearman-Brown formula. The reliability coefficients for either form using raw scores is .859 and using I.Q. scores it is .853.

The junior edition, which was used for the grade four, five and six pupils, consists of 82 items in five sub-tests: opposites, classification, anologies, arithmetic reasoning and following directions. The original norms were established by comparison with results on the National Intelligence Test. The coefficient of correlation, National vs Dominion, for the combined grades was found to be .88. A 1952 revision of the mental age equivalents was based on results from over 16,000 pupils.

Revised Edition, 195(

THE DOMINION TESTS
GROUP TEST OF LEARNING CAPACITY
(PRIMARY)

CAT. NO. 120 | Kgn., K.P. & GRADE I | FORM **B**

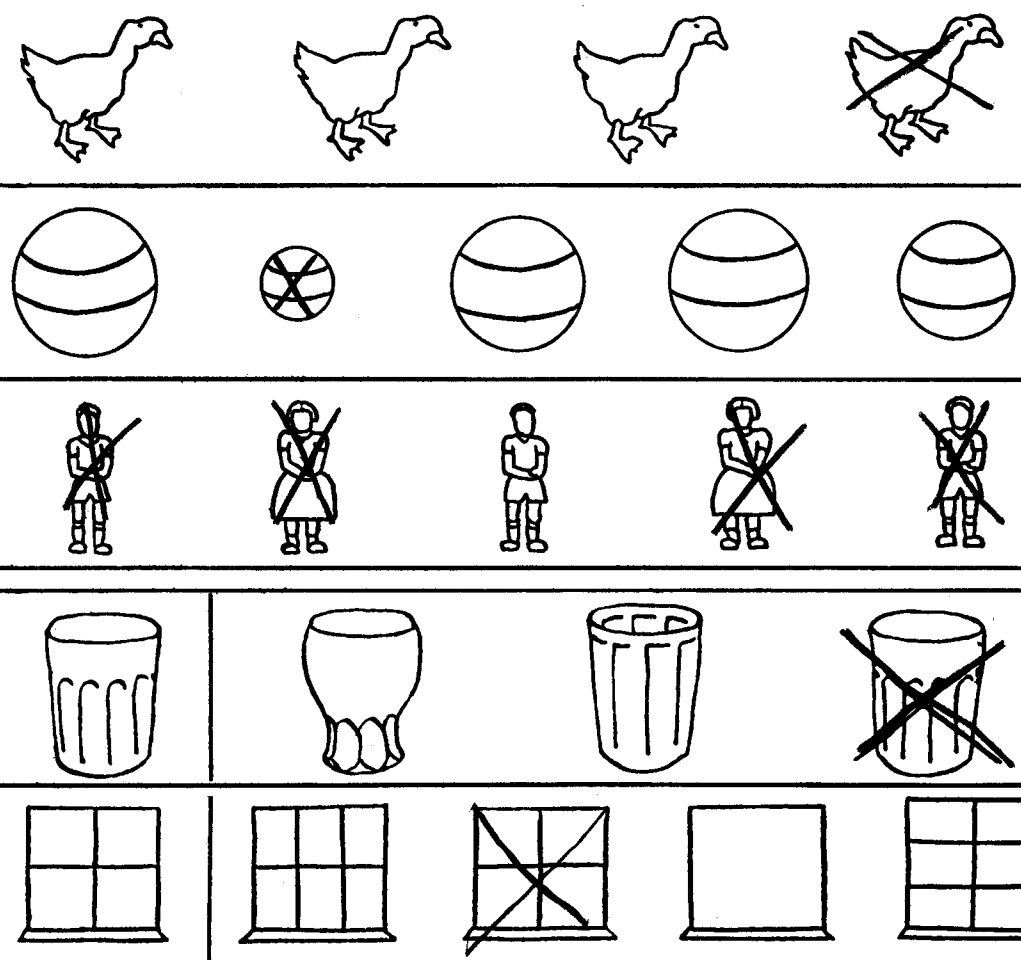
Name ..... Boy or Girl G
(In Capitals) Last First

Birthdate 8 13 54 Age 9-3 Grade 3
Month Date Year

School ..... Teacher Miss Stanton Today's Date Nov. 5/63

City, Town, or Municipality ..... Province .....

Practice Test

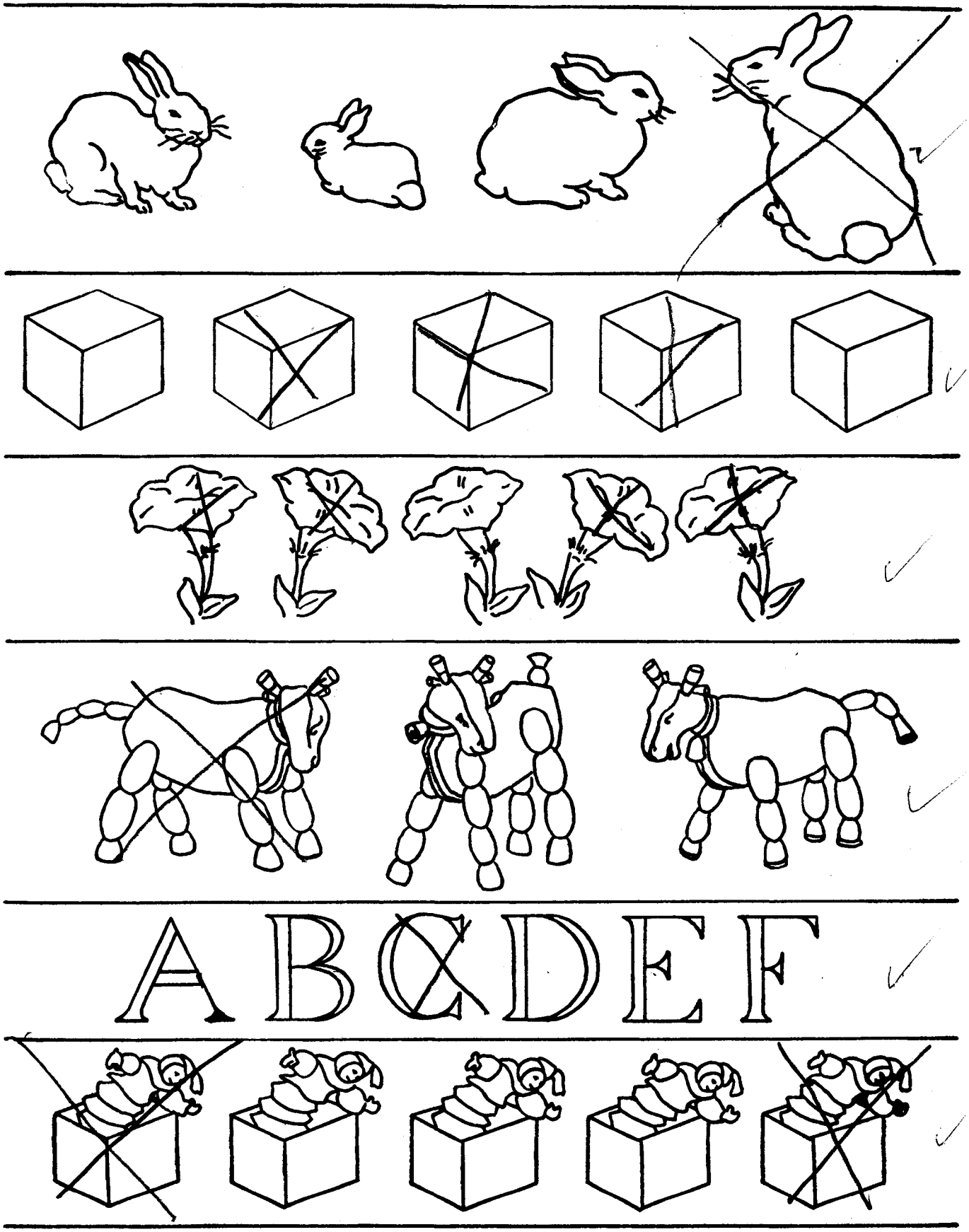


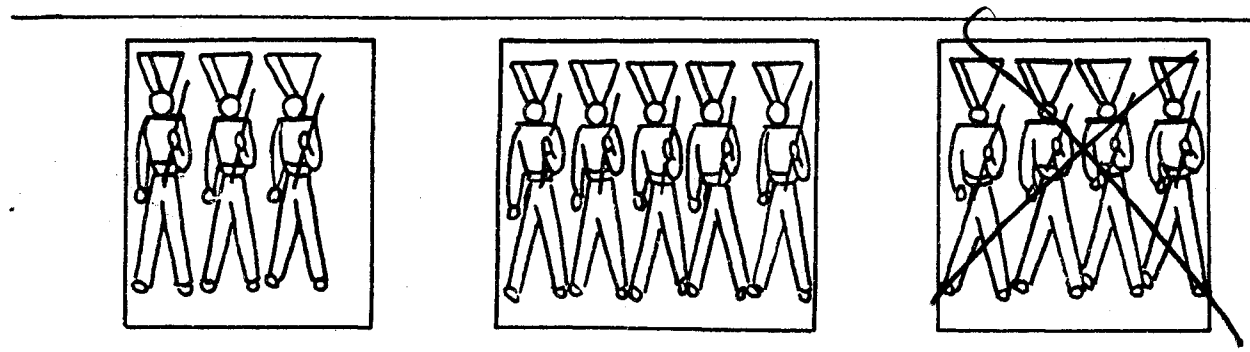
FOR MARKER'S USE ONLY

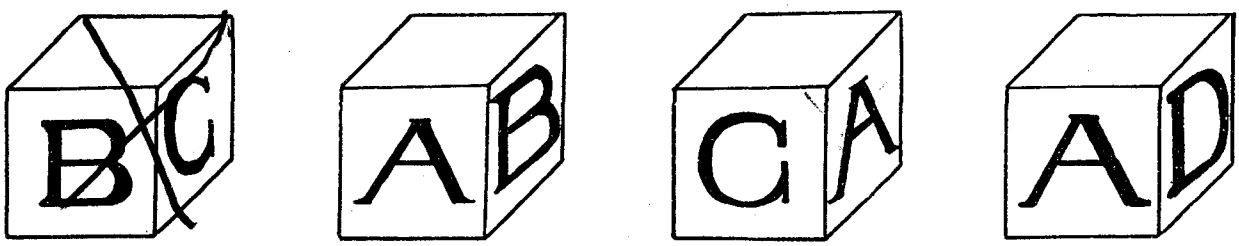
Test	1	2	3	4	Total
Score	11	16	11	9	47

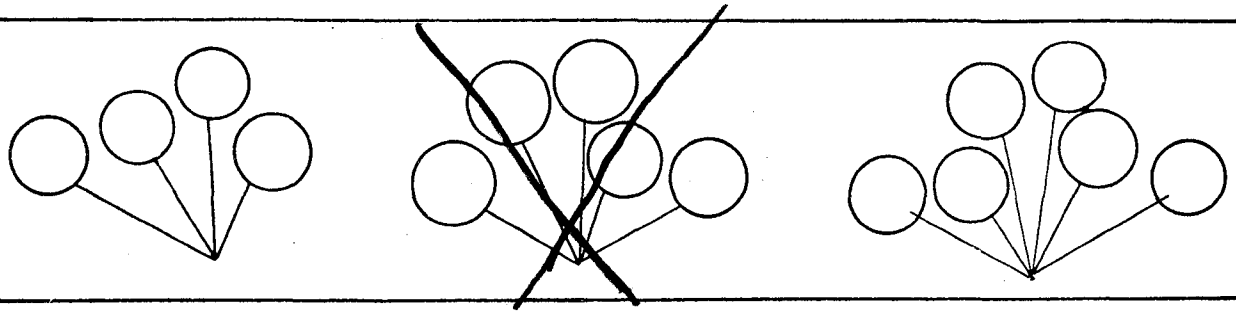
Mental Age	101
Chron. Age	111
I.Q.	91

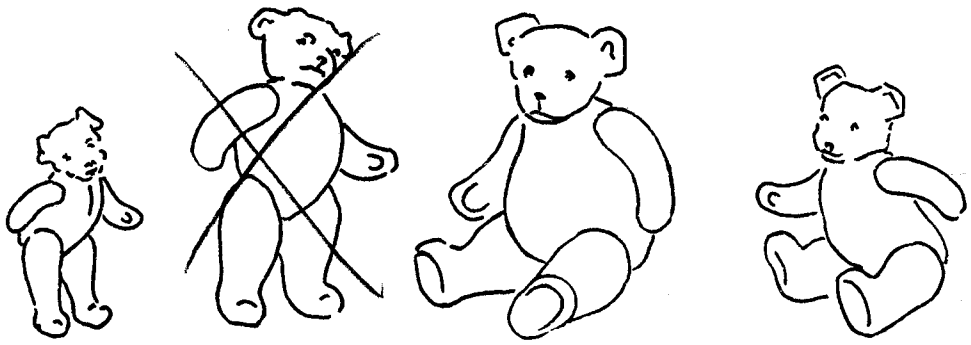
TEST 1

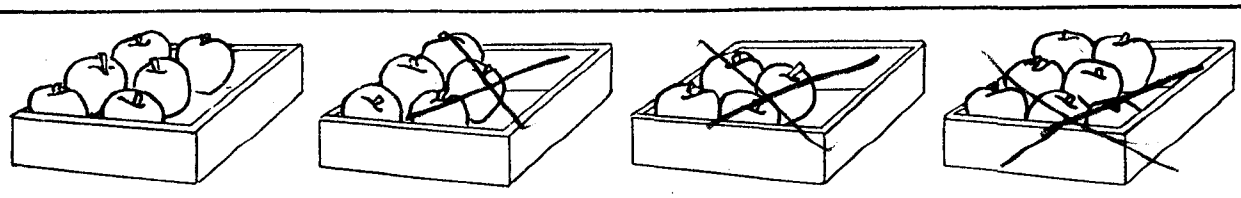


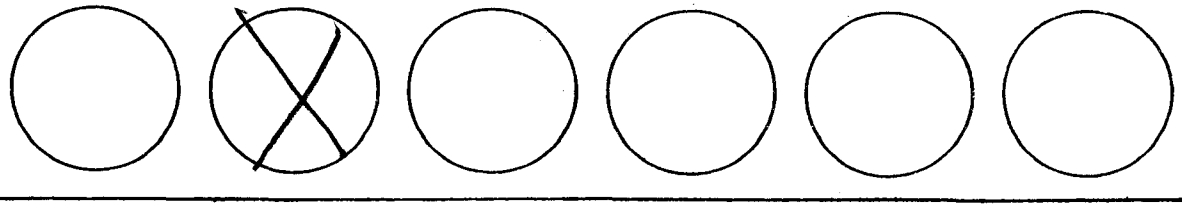






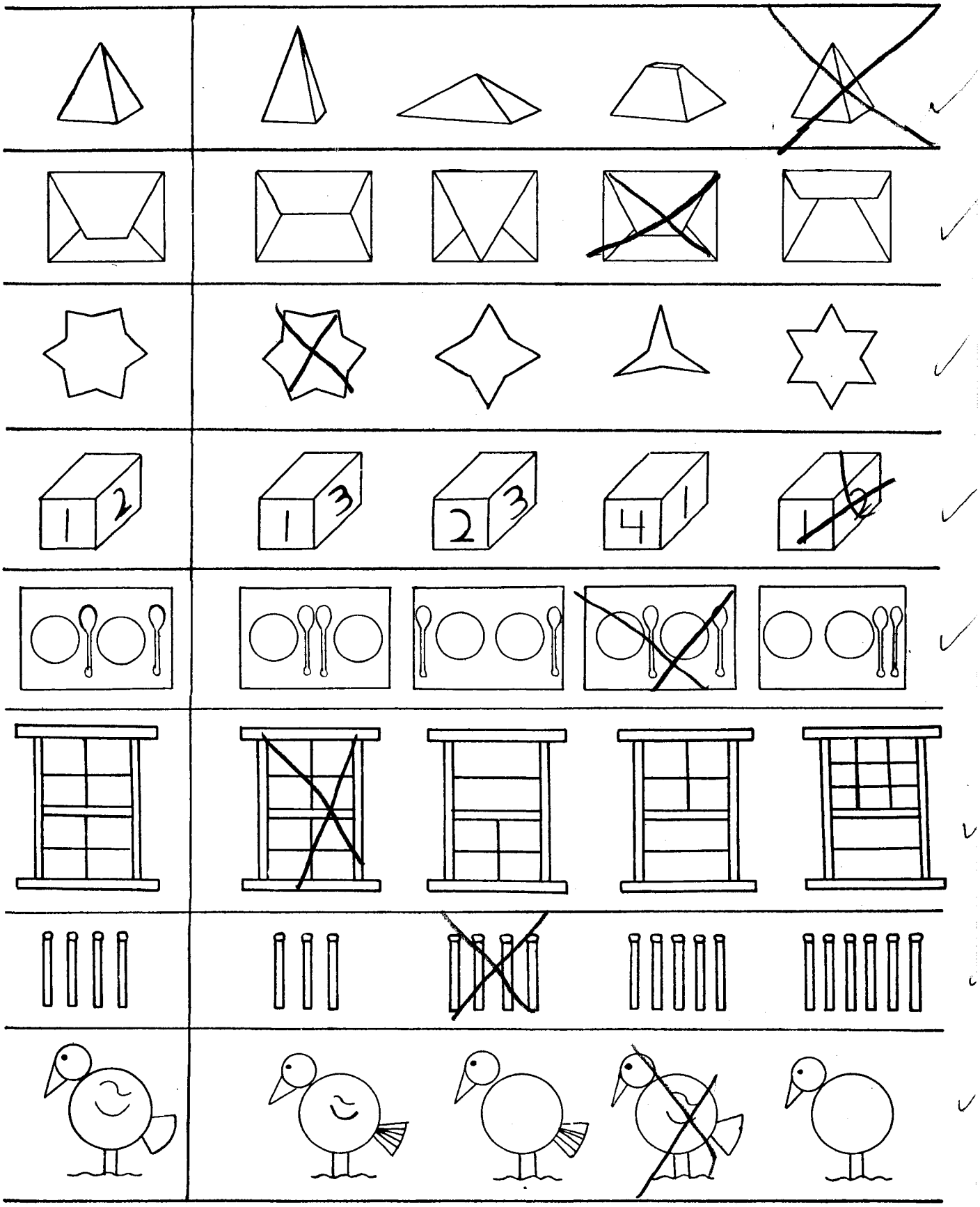


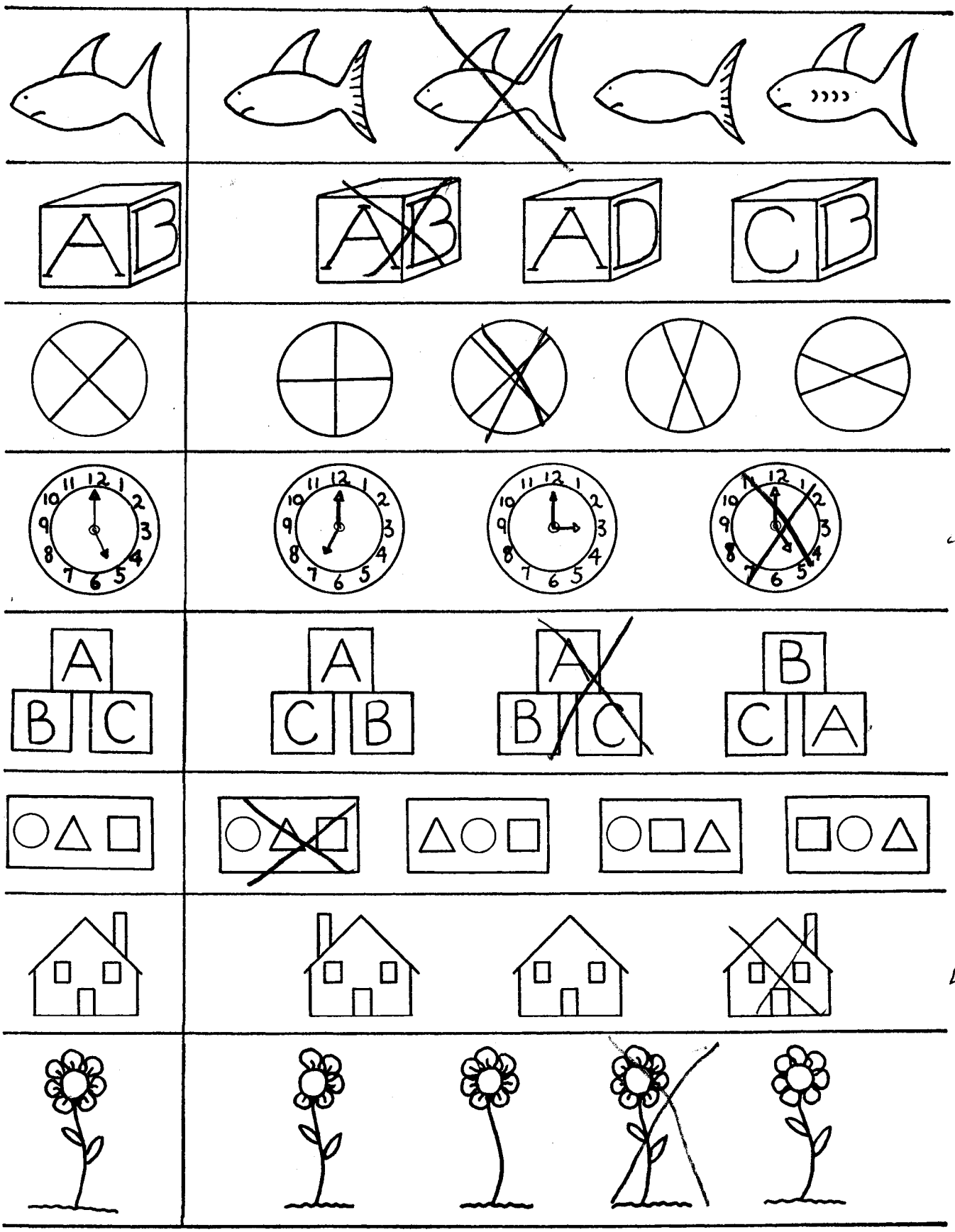




Following Directions Score.....//.....

TEST 2





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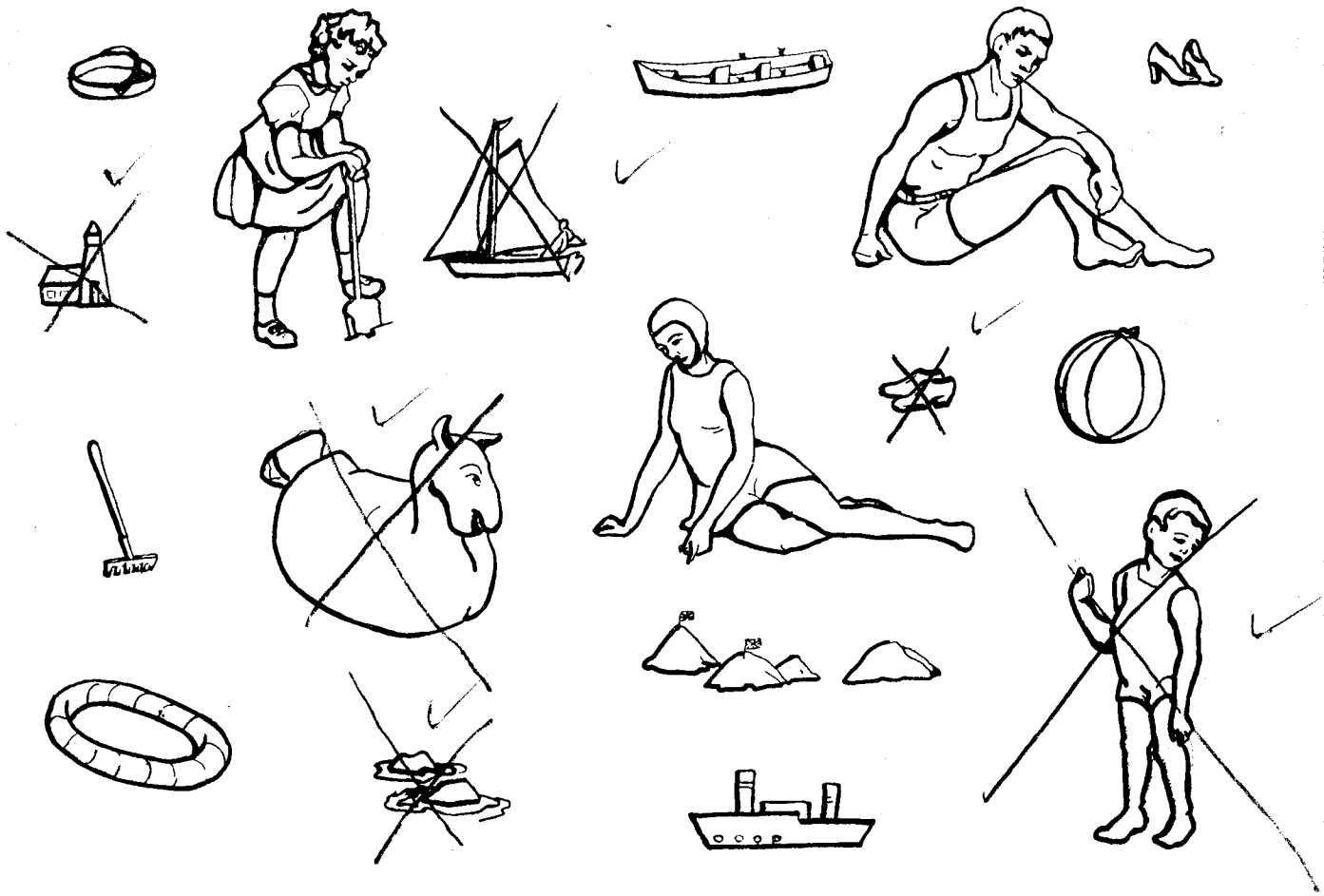
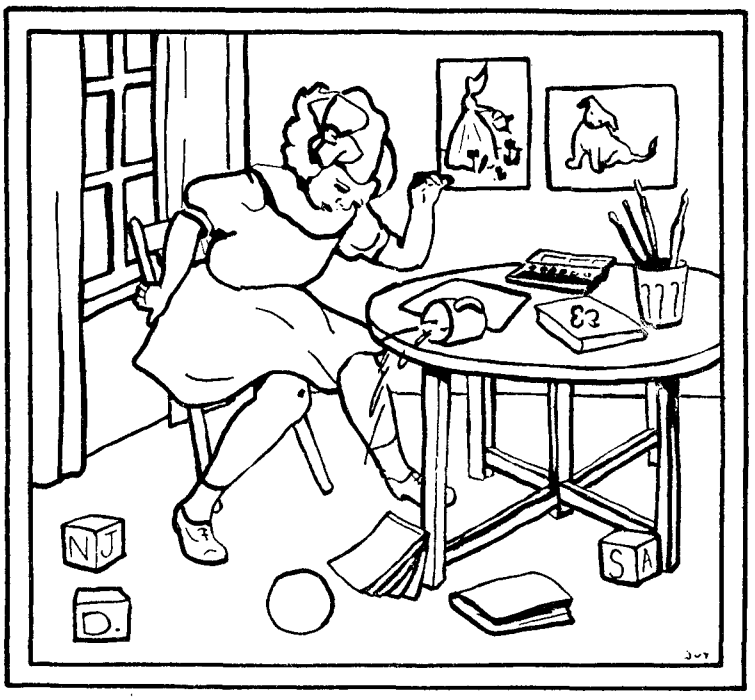
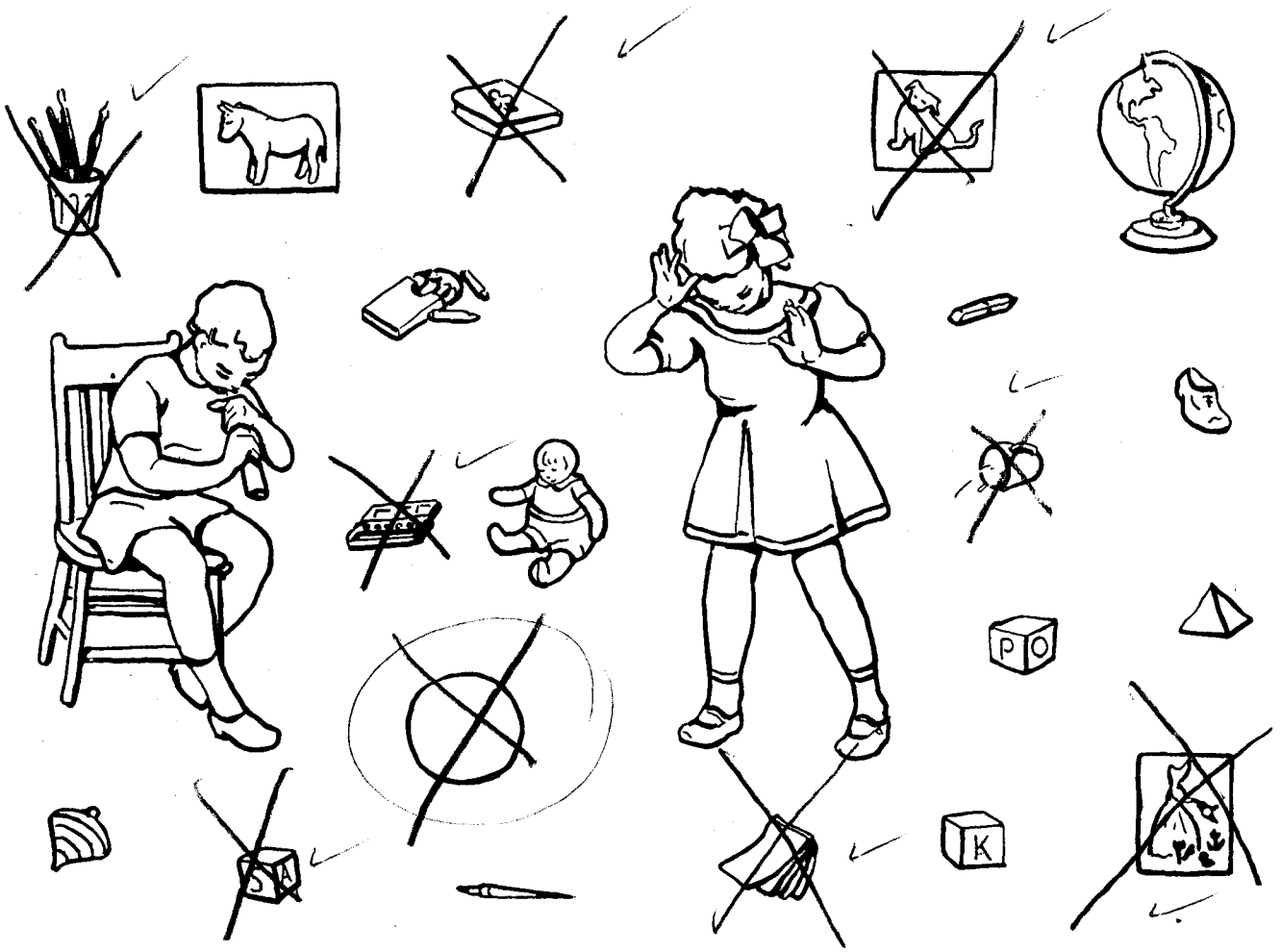
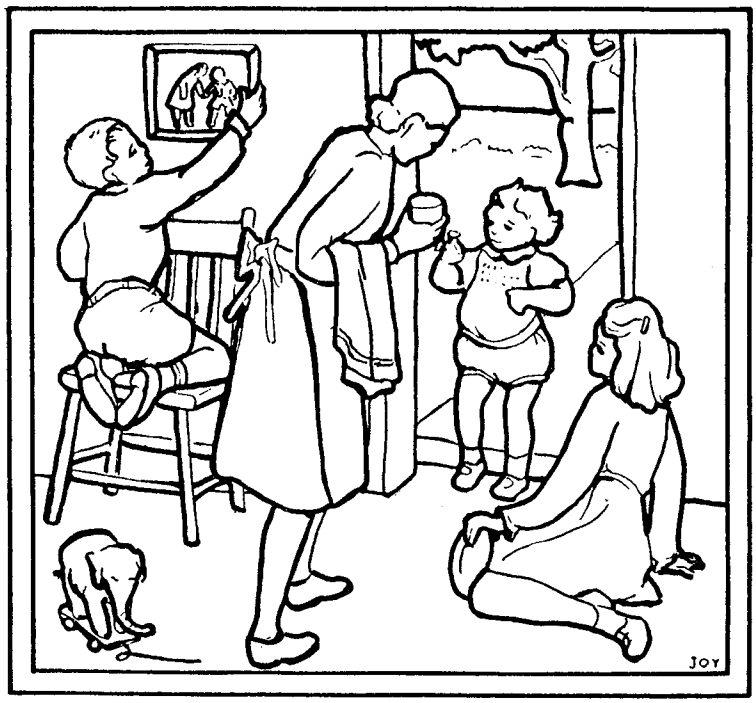






8-1

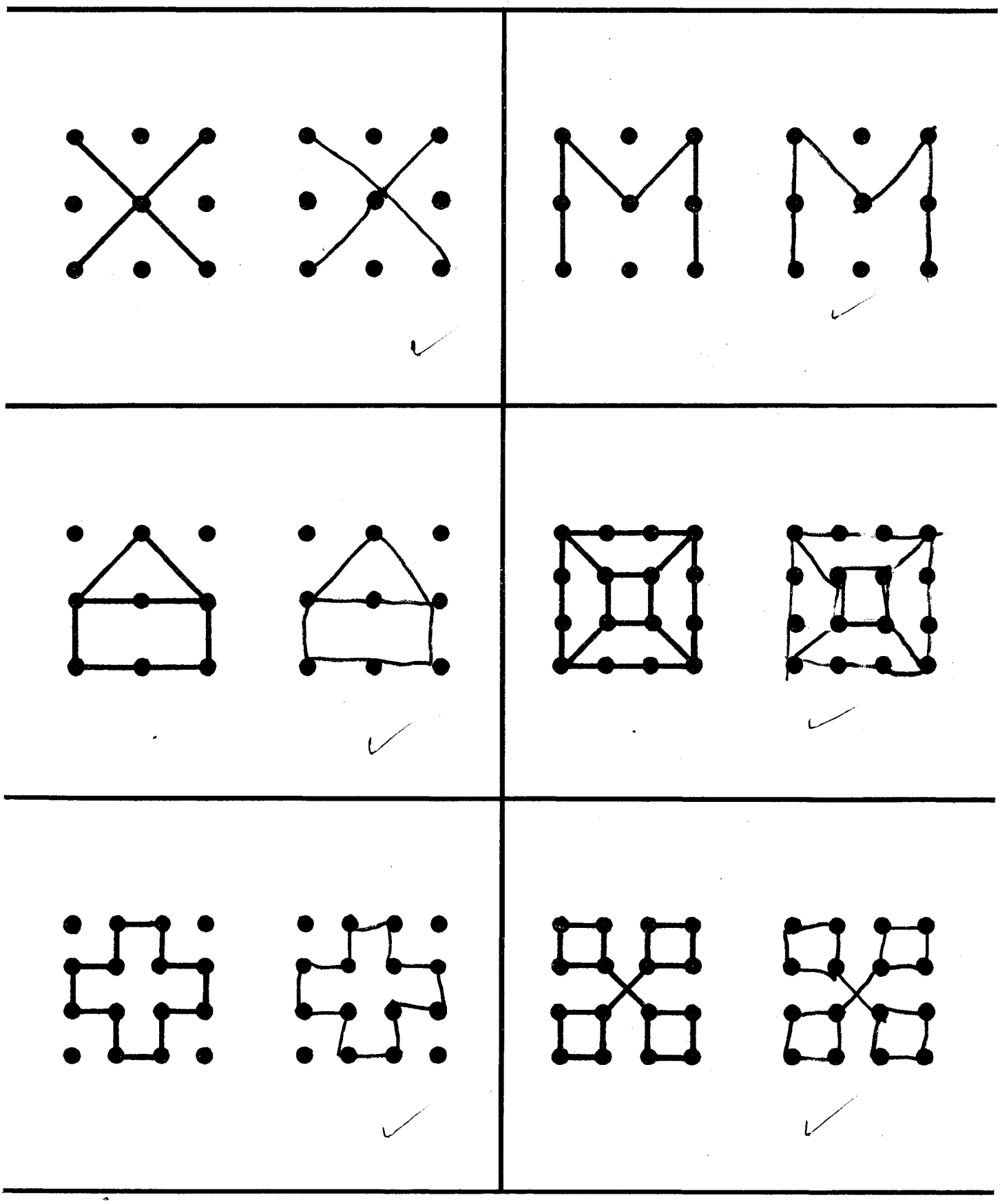


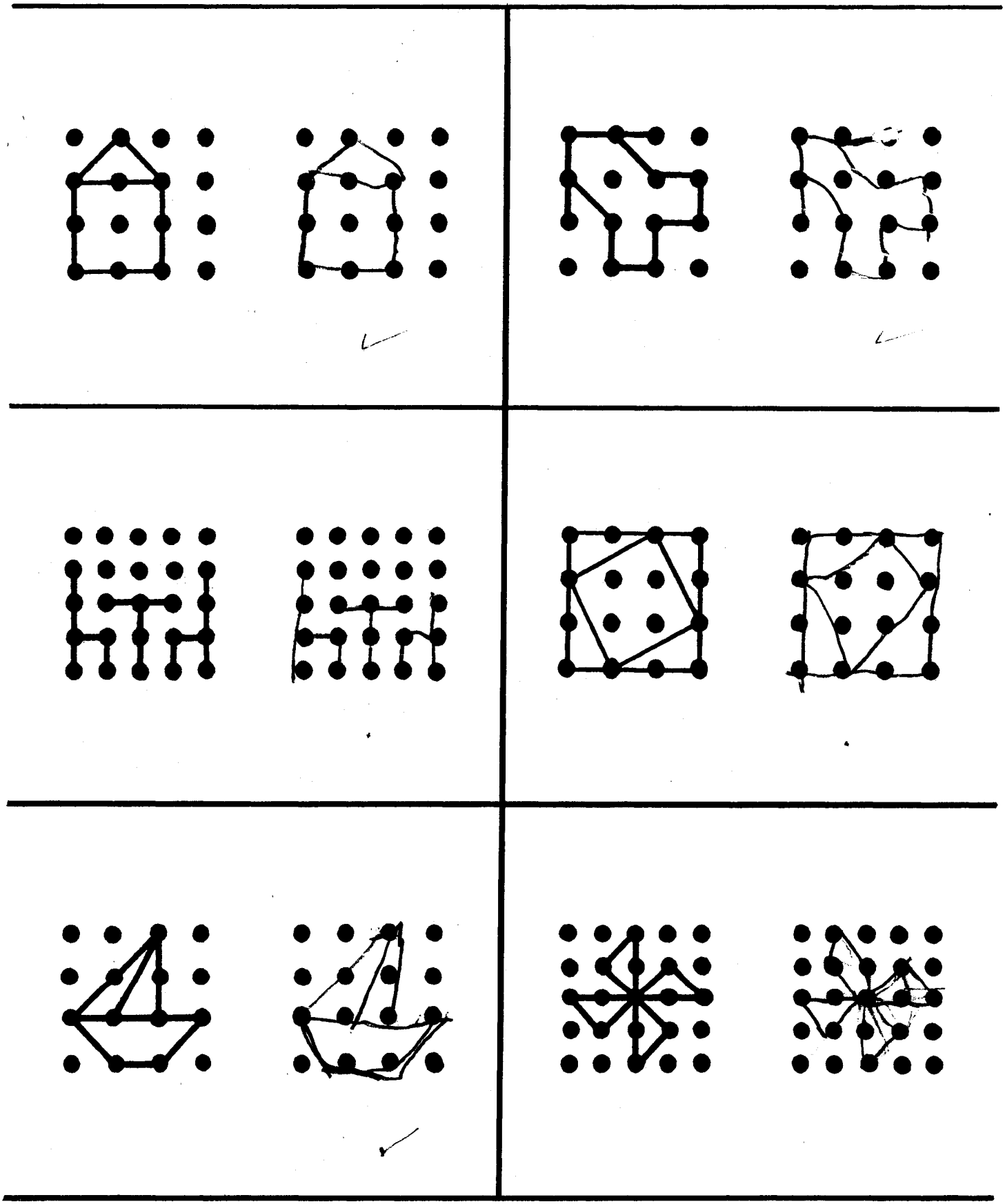
4-2

6

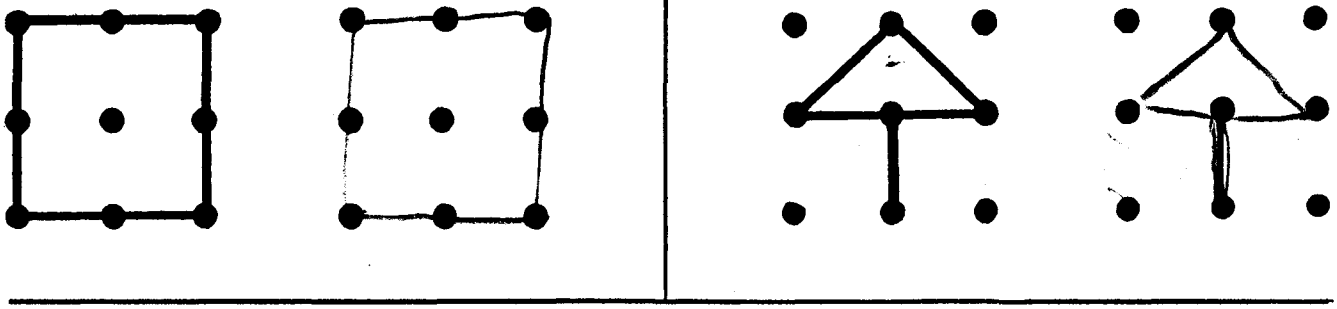
Picture Matching Score 21 = 10.5 (11)

TEST 4





Dot Drawing Score 7



THE DOMINION TESTS 1956 Edition

GROUP TEST OF LEARNING CAPACITY

JUNIOR—GRADES 4, 5, 6

CAT. NO. 121 FORM B

INSTRUCTIONS TO PUPILS

Listen closely to what you are told to do and work quickly and carefully

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO

Name..... Boy or Girl.....
IN CAPITALS *LAST* *FIRST*

Age 9 Birthdate .....
MONTH *DATE* *YEAR*

Grade..... Name of School .....

Province..... City, Town or Municipality.....

Date..... Name of Teacher.....

FOR MARKER'S USE ONLY

Test	1	2	3	4	5	Total
Score	11	13	7	6.	8	45

108
2

M.A.	130
C.A.	110
I.Q.	118

No. 121B PRINTED IN CANADA

Directions: In each of the questions in this exercise, you must find out which one of the five other words is **opposite** in meaning to the word at the beginning of the line. Then draw a line under that word, as shown in the example.

Look at this example:

thick.....heavy coarse small thin paper

The opposite of **thick** is **thin**, so a line has been drawn under *thin*.

When I tell you, go ahead and do those below in the same way. Work as quickly as possible. Skip any questions which seem too difficult and return to them after you have finished the others, if you have time.

---

1. **good**.....silly young bad rich dunce
2. **stupid**.....clever strong honest happy handsome
3. **crooked**.....straight plain round thick strong
4. **sour**.....candy taste sugar sweet lemon
5. **vanish**.....grow dream appear rise burst
6. **sure**.....careful uncertain dangerous slow hard
7. **innocent**.....wild bold haughty guilty risky
8. **within**.....beside inside outside aside offside
9. **doubtful**.....weak certain indefinite strong particular
10. **firm**.....hard kind stern loose light
11. **after**.....first former later early before
12. **even**.....straight irregular although insecure weak
13. **rejoice**.....frighten despair hate love delight
14. **many**.....less more few none all
15. **reveal**.....revolt conceal conclude divide retire
16. **timid**.....strong meek loud cross bold
17. **crazy**.....sane clever stupid brilliant wild

Do not turn to the next page until you are told to do so.

OPPOSITES SCORE.....11

B

TEST 4

Directions: Write the answer to each of the following questions on the line at the end of the question. Do not spend too much time on any one question; work as quickly as possible.

---

1. Mary had 12 goldfish; 5 died and she was given 2 more. How many has she now? 9
2. What number added to 8 and 7 will give 24? 9
3. Anne bought 20 buns at 4 cents each. How many cents did this cost her? 80
4. There were 162 boys going by bus to a football game. If they were divided evenly among 6 buses, how many boys were in each? ..... ____
5. How old was Tom two years ago if he will be 10 next year? 12
6. I spent $30 in 4 stores. I spent $10 in the first store, $6 in the second, and $5 in the third. How many dollars did I spend in the fourth store? 9
7. Jim bought 3 apples at 4 cents each and has 7 cents left. How many cents did he have at first? 19
8. If pencils sell at the rate of 3 for 5 cents, how much must I pay for a dozen pencils? 20
9. What number is 3 more than twice four? ..... ____
10. What is ½ of ½ of 24? 6
11. The grocer divides a 20-pound bag of sugar evenly into three small bags and has 2 pounds left over. How many pounds does a small bag hold? ..... ____
12. Bill spent 5 cents each for 2 pencils, and 25 cents for a note-book. How much change should he get from a one-dollar bill? ..... ____
13. What is the smallest number that may be added to 46 to make it exactly divisible by 9? ..... ____
14. What number is 5 times one-third of 12? ..... ____
15. If I buy pears at the rate of 3 for 5 cents, how many will I get for 45 cents? 9

Do not turn to the next page until you are told to do so.

ARITHMETIC REASONING SCORE 6

TEST 3

Look at this example:

Grass is to **green** as **snow** is to
cold rain winter white ice

You must choose the right answer from the five words. Now just as the colour of **grass** is **green** so the colour of **snow** is white. *White* is the answer, so a line has been drawn under it.

When I tell you, go ahead and do the rest in the same way. In each case find the best answer and draw a line under it. Work as quickly as possible.

---

1. **Man** is to **husband** as **woman** is to.....child girl wedding dress wife
2. **Food** is to **hunger** as **water** is to.....drown boat eat thirst wash
3. **Woman** is to **skirt** as **man** is to.....work boy pipe father trousers
4. **Sheep** is to **lamb** as **horse** is to.....stable colt wagon oats harness
5. **Aeroplane** is to **air** as **submarine** is to.....boat water fly navy sink
6. **Add** is to **enlarge** as **subtract** is to.....remainder divide reduce sum arithmetic
7. **Train** is to **station** as **ship** is to.....port sailor ocean wreck travel
8. **Teacher** is to **pupil** as **doctor** is to.....measles hospital medicine school patient
9. **Horse** is to **hoof** as **dog** is to.....bark kennel paw growl puppy
10. **Meat** is to **butcher** as **bread** is to.....flour baker food butter sandwich
11. **Wrist** is to **bracelet** as **finger** is to.....thumb ring hand nail arm
12. **Sheep** is to **flock** as **bee** is to.....hive sting honey swarm insect
13. **Handle** is to **hand** as **pedal** is to.....car hammer foot bicycle brake
14. **Hand** is to **finger** as **foot** is to.....leg shoe toe glove ankle
15. **Wheat** is to **granary** as **book** is to.....school read pages library author
16. **Wet** is to **dry** as **hate** is to.....wash hurt kill teach love
17. **Main** is to **mane** as **bear** is to.....cub fur wild den bare

Do not turn to the next page until you are told to do so.

ANALOGIES SCORE...../.....

Directions: Each question in this test consists of five words. Four of these words are alike in some way and the other one is different. In each question you must find which word does not belong in the list and draw a line under it.

Look at this example:

Tom Jack Agnes Will Peter

These are all names of boys, except **Agnes**, so a line has been drawn under *Agnes*. When I tell you, go ahead and do those below in the same way. Work as quickly as possible.

---

1. trousers shirt boy hat coat
2. friend chum partner pal thief
3. celery violet daisy tulip aster
4. run leap hop jump fall
5. rifle soldier officer sergeant captain
6. telephone carriage boat aeroplane car
7. oak maple elm tree beech
8. bench chair sofa stool desk
9. bird cage beast fish reptile
10. willing generous mean friendly kind
11. crowd audience mob speaker group
12. camp teepee tent squaw wigwam
13. lair cave lion den hive
14. hope regret expect desire wish
15. scatter collect combine gather unite
16. go permit depart withdraw leave
17. wagon bicycle car truck van

Do not turn to the next page until you are told to do so.

CLASSIFICATION SCORE 13

TEST 5 B

Directions: In these questions you must do just what you are told to do. You may refer to the alphabet below if you need to in doing any of the questions. All answers which consist of words or letters must be printed in capitals. Work as quickly as possible.

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

---

1. On the line draw Y as if it were printed upside down ..... _____( ) ( )
2. Two letters which come next to each other in the word LAUGHTER come next to each other in the alphabet. Print the two letters on the line ..... _____
3. If STOP is POTS spelled backwards print an X in the brackets; if it is not, print an X on the line ..... ( ) _____
4. In the right-hand brackets print the seventh letter from the end of the alphabet ..... ( ) ( ) ( )
5. On the second line print the third letter of the longest word in this sentence ..... _____ _____ _____
6. Print in the second brackets the letter which follows the sixth letter of the alphabet ..... ( ) ( ) ( )
7. In the left-hand brackets write the number of I's in MISSISSIPPI ..... ( ) ( ) ( )
8. On the line print the letter R as it would appear if seen in a mirror ..... _____
9. Print on the line the last three letters of the word MONEY in the opposite order to that in which they come in the word ..... _____( ) ( )
10. Here are three words and three lines. On the third line print the first letter of the second word and on the second line print the third letter of the first word. EASY LATE OPEN _____ _____ _____
11. In the word ABIDE, four of the letters come in the same order as they do in the alphabet. Print the other letter in the brackets..... _____ _____( ) .
12. Join O to C by a line that passes above T and below N and K..... O N T K C
13. Print the first letter to the right of the letter which is half-way between L and P in the alphabet ..... _____
14. Print the letter which comes just as far before N in the alphabet as E comes before H ..... _____
15. Print the letter in the word SUPERFLUOUS which is as far from the beginning of the word as it is from the beginning of the alphabet ..... _____

FOLLOWING DIRECTIONS SCORE 8

END OF TEST

Abbreviated Form VII Minnesota Tests of Creative Thinking

This battery of tests was developed by the Bureau of Educational Research of the University of Minnesota, which began its studies of creative thinking in 1958. Some of Guilford's measurement devices, such as unusual uses, problem situations, improvements and consequences, were adapted for use from kindergarten through graduate school by substituting materials which children would find more stimulating. Experimentation was also begun with other kinds of tests in an attempt to develop tasks which would be models of the creative process. While Guilford insisted that measures represent single factors the Minnesota people tried to develop complex tasks which would involve several aspects of the whole creative process, be interesting to the subjects, and permit him to "regress in the service of the ego". (This ability to return to earlier types of behaviour or adjustment in order to develop new methods of response is a factor they feel is important in creative thinking.)

Four of the tasks developed were used in the present study - a) Incomplete Figures b) Circles c) Product Improvement d) Unusual Uses of Tin Cans. The first two involve

non-verbal stimuli and a non-verbal response, the third involves non-verbal stimulus and a verbal response and the fourth both a verbal stimulus and response.

The Incomplete Figures Test is an adaptation of the Drawing Completion Test developed by Kate Franck and used by Barron (1958) in studies of creativity. Ten squares are presented, each containing different stimulus lines and the subject is instructed to add lines to sketch some interesting object or picture; to try to think of a picture or object no one else will think of; to try to make it tell as complete and interesting a story as possible by adding to or building up the first idea. The incomplete figure sets up in the subject tensions to complete the figure in the simplest and easiest way possible. In order to produce an original and elaborate set of figures, the subject must be able to handle his tensions and delay closure.

The Circles Test was originally designed to measure fluency and flexibility and then the directions were modified to stress originality and elaboration. Two pages of circles, one inch in diameter each, are presented as stimlulus figures and the subject is instructed to see how many objects or pictures he can make from them. Though four types of thinking (fluency, flexibility, originality and elaboration) are stimulated, the ten minutes time allowed does not permit emphasis

on all four and therefore individual tendencies appear.

The Product Improvement Task is a complex one with a high degree of face validity. The subject is shown a picture of a stuffed toy dog and invited to make clever, interesting, unusual changes in it so children will have more fun playing with it. This test particularly, permits "regression in the service of the ego" and enables subjects to play around with ideas they would avoid in a more serious task.

The Unusual Uses of Tin Cans is a direct modification of Guilford's brick uses test. It was felt that tin cans are more readily available to children for experimentation, manipulation and play. There is the difficulty presented for many subjects of overcoming the need to see the tin can as a container before being able to think of other uses.

All four tests are scored for fluency, flexibility, originality, and elaboration. Although the whole theory behind creativity testing suggests the inadvisability of a single score being used as an index of creativity, Torrance in studies mentioned (1962) seems to use this method for convenience and usefulness.

Because of the relative recency of work with these tests and others similar to them, validity data is limited.

On the studies which have been done, it is found that these tests do discriminate industrial arts students rated as highly creative from those rated as least creative (Torrance, 1962, p. 50); saleswomen who sell most from those who sell least and saleswomen who work in "creative" departments from those who work in routine departments (Torrance, 1962, p. 48). In the elementary school system, the tasks were validated in terms of observed behavioural experimentation with science toys in small groups of five children, on the basis of peer and teacher nominations and on the basis of achievement of the traditional kinds (Torrance, 1962, p. 50).

S N

ABBREVIATED FORM VI

MINNESOTA TESTS OF CREATIVE THINKING

Name _____ Date 24 September 1958

Age 10 Sex boy Grade or classification Grade 5.

School Ada [illegible] City [illegible]

What kind of wo rk would you like to do when you complete your education?

The four tasks in this booklet give you a chance to use your imagi ation to think up ideas. In two of these tasks you will be asked to put your ideas into words. In the other two, you will be asked to put your idea s into drawings, sketches, or figures. We want you to think of as many ideas as you can. Try to think of unusual, interesting, and exciting ideas -- something no one else in your class will think of.

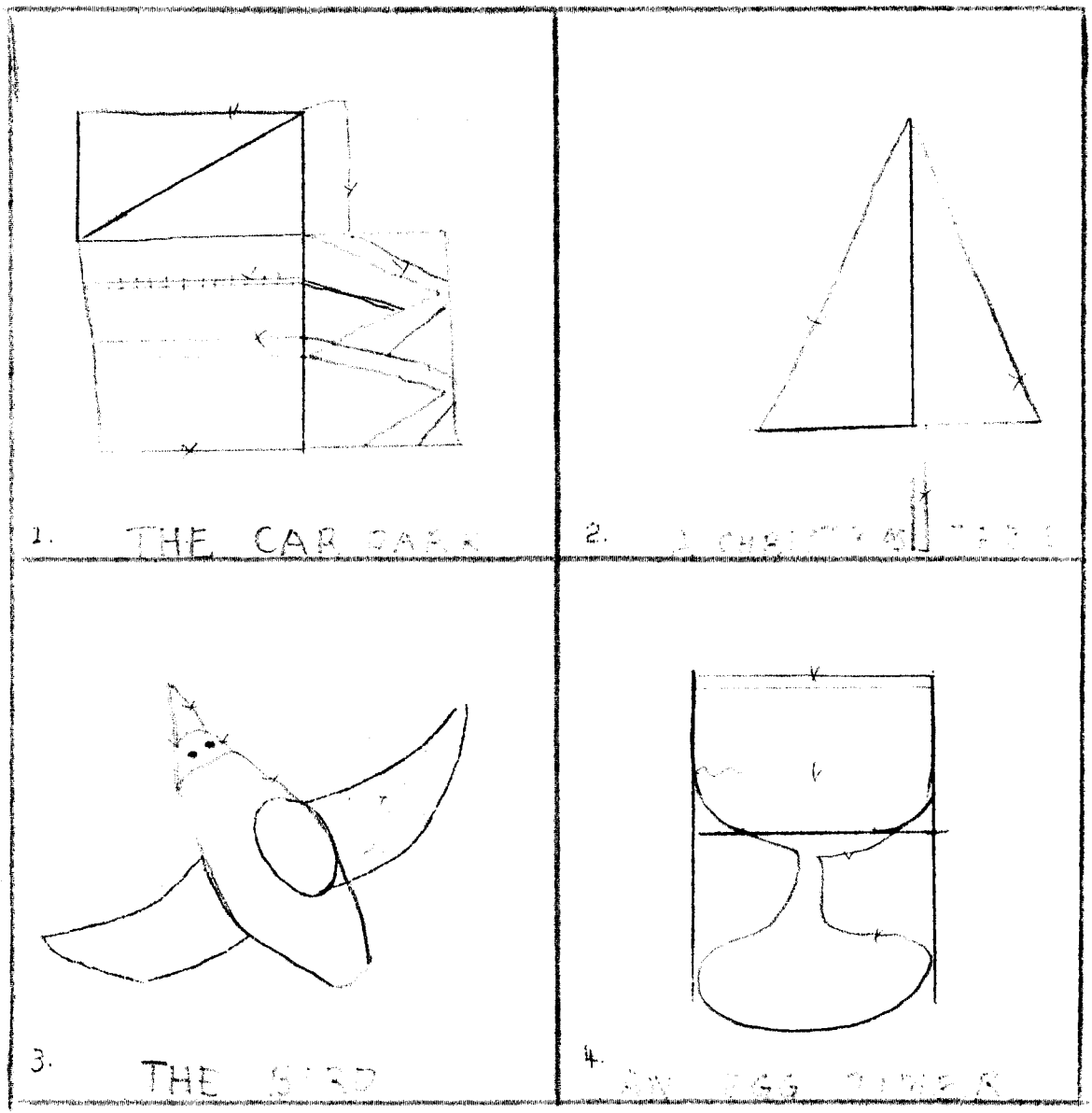
You will be timed on each of these four tasks, so make good use of your time. Work as fast as you can without rushing. If you run out of ideas before the time is called, wait until instructions are given before going on to the next task.

Do not pay any attention to the rest of this page, but do not turn to the next page until told to do so.

***

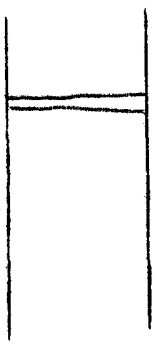
TASK 1: FIGURE COMPLETION

By adding lines to the figures on this and the next page, you can sketch some interesting objects or pictures. Again, try to think of some picture or object that no one else will think of. Try to make it tell as complete and as interesting a story as you can by adding to and building up your first idea. Make up a title for each of your drawings and write at the bottom of each block next to the number of the figure.

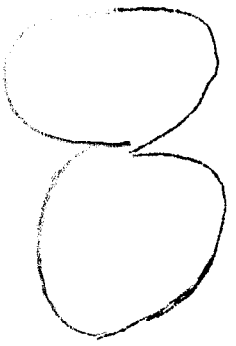


Turn to next page

feat
C=2
E=1



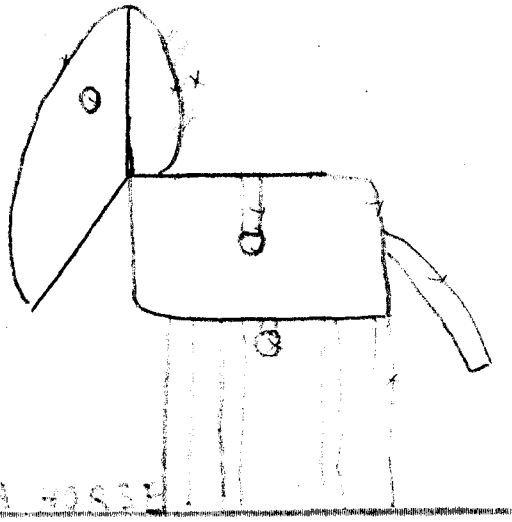
5 A GOAL POST



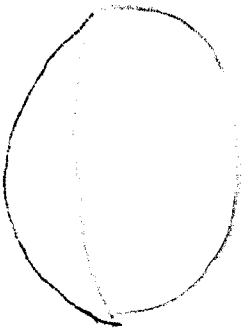
6. A LINE OR LINES

feat
C=2
E=1

feat
C=2
E=10



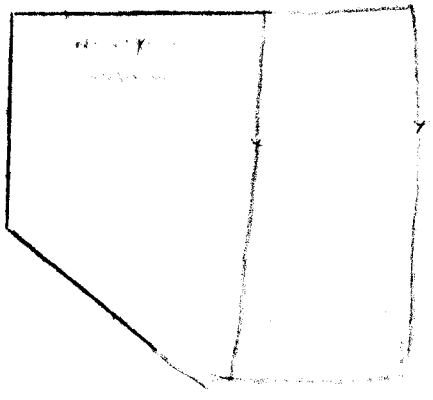
7. A HOUSE



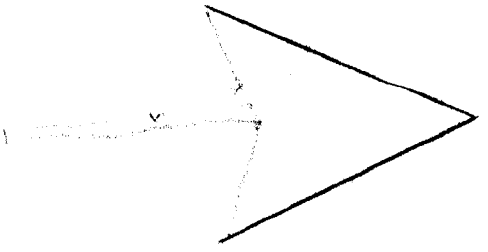
8. A TRIANGLE

feat
C=2
E=2

feat
C=1
E=3



9. A BOOK

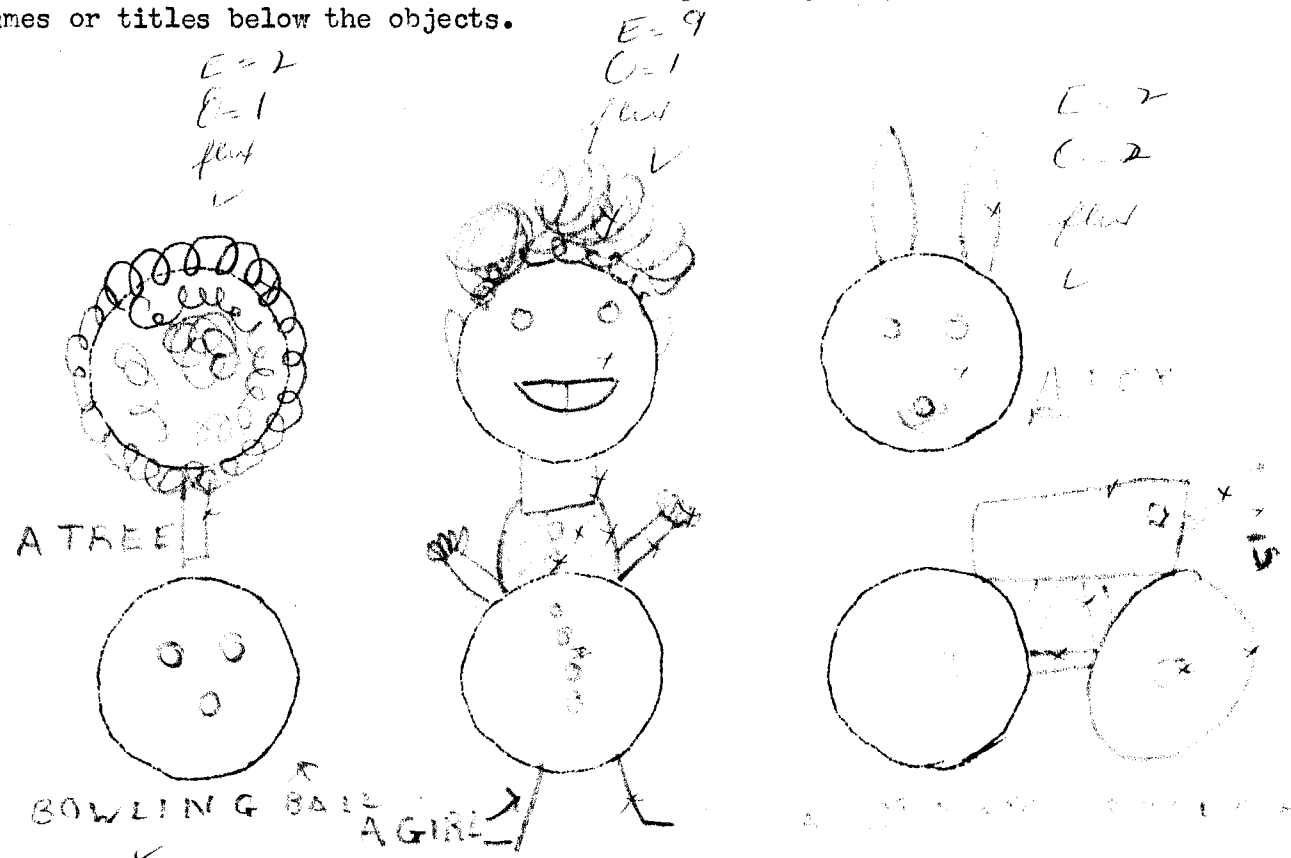


10 A KITE

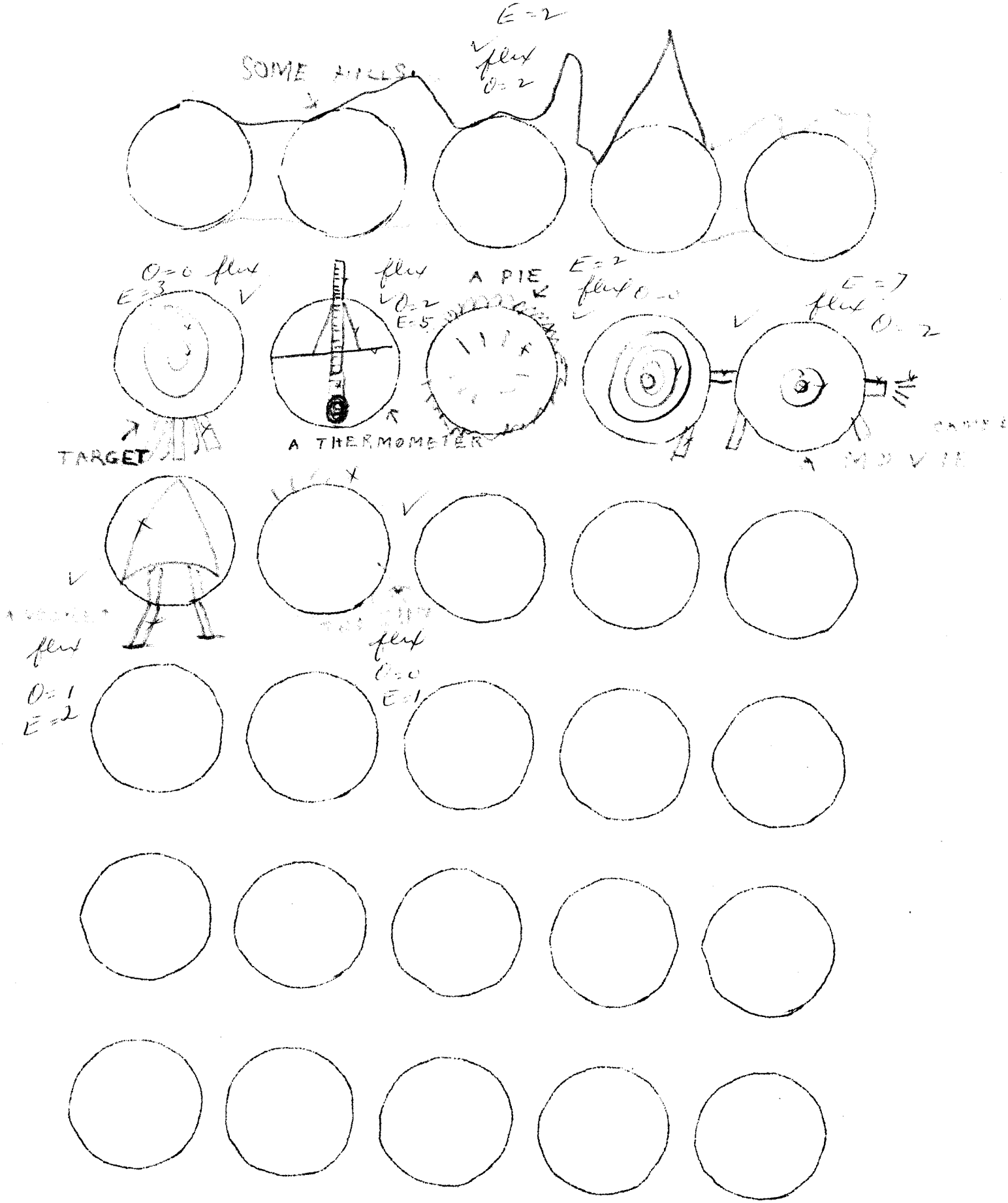
feat
C=0
E=2

TASK 2 : CIRCLES

In ten minutes see how many objects or pictures you can make frome the circles below and on the next page. The circles shoud be the main part of whatever you make. With pencil or crayon add lines to the circles to complete your picture. You can place marks inside the circles, outside the circles, or both inside and outside the circles--wherever you want to in order to make your picture. Try to think of things that no one else will think of. Make as many different pictures or objects as you can and put as many ideas as you can in each one. Make then tell as complete and as interesting a story as you can. Add names or titles below the objects.

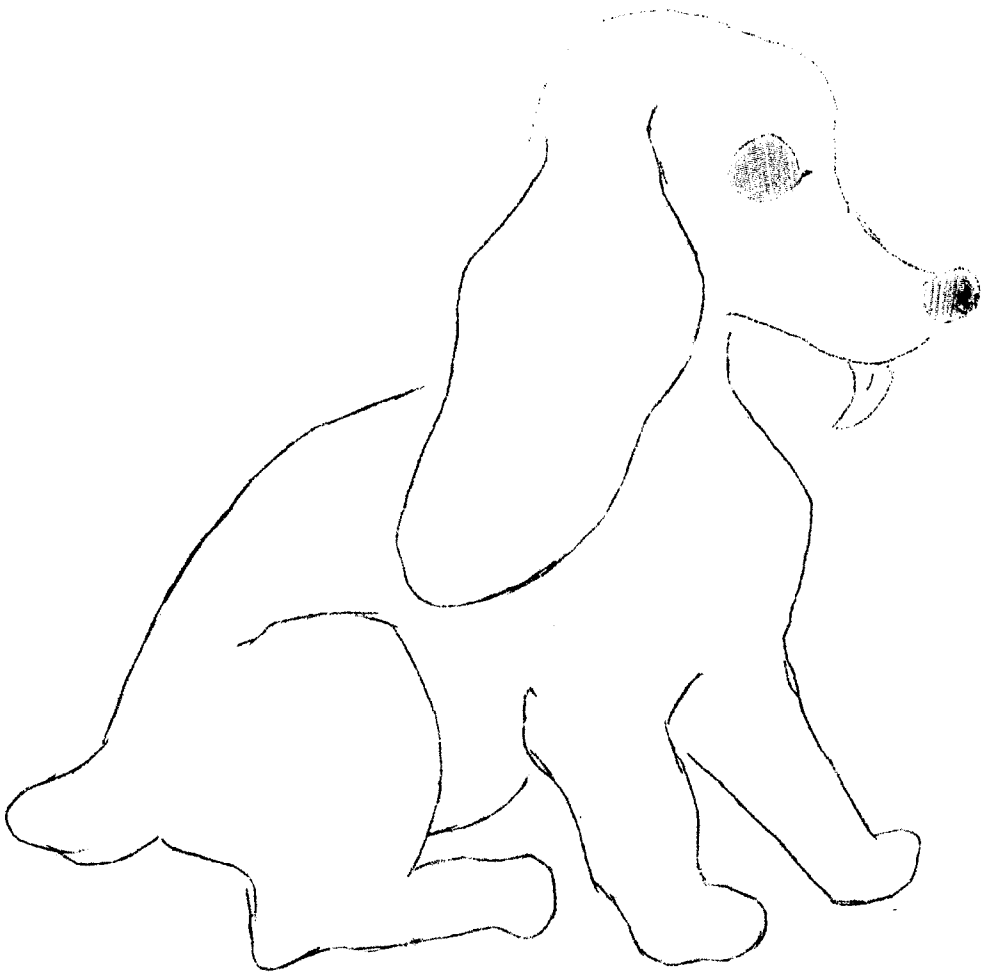


Turn to next page.



TASK #: PRODUCT IMPROVEMENT

At the bottom of this page is a sketch of a stuffed toy dog of the kind you can buy in most dime stores for a half dollar to a dollar. It is about six inches long and weighs about three ounces. In the spaces on this page and the next one, list the cleverest, most interesting and unusual ways you can thi nk of for changing this toy dog so that children will have more fun playing with it. Do not worry about how much the change would cost. Think only about what would make it more fun to play with as a toy.



0-0 1. Make it bigger. ✓ (magn)

0-0 2. DRESS IT UP. ✓ (addition)

0-0 #. MAKE IT LONGER ✓ magn

0-0 4. HAVE A BIGGER [illegible] ✓ magn

0-0 5. [illegible] ✓ (addition)

Turn to next page.

0=1 6. Make it sound ✓ Clear appeal

0=1 7. have bigger head ✓ magnif

0=0 8. have a bigger ✓ magnif

0=1 9. longer ✓ magnif

0=0 10. its ✓ magnif

0=0 11. ✓ motion

0=2 12. ✓ Change color

0=1 13. have bigger eyes ✓ magnif

0=2 14. ✓ addition

15.

16.

17.

18.

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29.

30.

31.

32.

TASK 4: UNUSUAL USES (Tin cans)

Most people throw their empty tin cans away, but they have thousands of interesting and unusual uses. In the space below and on the next page, list as many of these interesting and unusual uses as you can think of. Do not limit yourself to any one size of can. You may use as many cans as you like. Do not limit yourself to the uses you have seen or heard about; think about as many possible new uses as you can.

fluency 13
flex 5
O - 9
E = 2

O=1 E=1 1. Make them into tin ... ✓ construction

O=0 2. keep ... ✓ container

O=0 3. use them ... ✓ rotary ...

O=0 4. use them ... ✓ cooking ...

1 O=0 5. paint ... ✓ decor ...

O=1 6. melt them ... ✓ construction

O=1 7. melt ... ✓ use in daily

1 O=1 8. melt ... ✓ construction

=1 O=1 9. melt ... ✓ " "

O=1 10. melt ... ✓ "

O=1 11. melt ... ✓ "

12.

13.

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45.

46.

47.

48.

Instructions to Majority Group

You remember that last week I came to the school and gave your class a test in which I asked you to tell which of three lines on one card was the same length as one line on another card.

It wasn't a very hard test was it? And yet different people answered differently on quite a few of the questions.

Also that same day I asked you to pretend you were having a birthday outing to the show and could invite one friend to go along. Here again of course different people chose different friends to go with them. Now let's imagine that _____ here was the friend you picked. Sometimes, especially on things that don't matter too much we all like to agree with a friend just because he is our friend. That's what I am going to ask you to do today...to agree with _____ simply because he is your friend.

Today I'm going to ask you to do the test about picking lines again. In fact, I want you to do it several times. Each time there will be one other of your classmates brought in with you.

Today though I want you to give special answers to the questions. _____ will sit here in the first seat and will give his answer first. Then when each of you answer I want you to give the same answer that he gives. Now you may agree with him or not but I want you to be sure to give the very same answer as he does anyway. The friend we bring in each time may give the same answers and he may not. No matter what he or she says I want you all to give the same answers - the answer that _____ gives first.

I will give each of you a piece of paper with the twelve numbers (that's the number of questions there are) on. _____ will have the answer I want given and each of you can follow along on yours to see how far we have gone. When you answer make it sound like you have been thinking about your answer. Instead of writing your answer down I want you to say it out loud. I will be reading instructions about choosing. But don't really choose. Give the same answer.

Now each time we bring another classmate in to join you I would like him or her to think you are all just arriving together. So I will ask you to go out in the hall each time. Those from Miss Munroe's class stand at the top of the stairs as though you have just come up and those from Mr. Toew's class go over at the bottom of the other stairs as though you have just come down.

Mrs. K. who will be helping me will get your classmate

from the Library where he or she is studying and pick you up as she comes along the hall. So you will all come in here together.

You will please take the seats you are in now and leave this seat for your classmate.

Do not ask any questions during the test. If you have any questions, ask them now.

I might just mention, as Mr. Sweetman told you before, none of this has anything to do with how well you do in school or will make any difference on your report card. You are all helping me out with some work I need to do for my school work and I appreciate it very much. It would help if you don't talk about what we've done here today until I'm all through with all of it which will be sometime next week.

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